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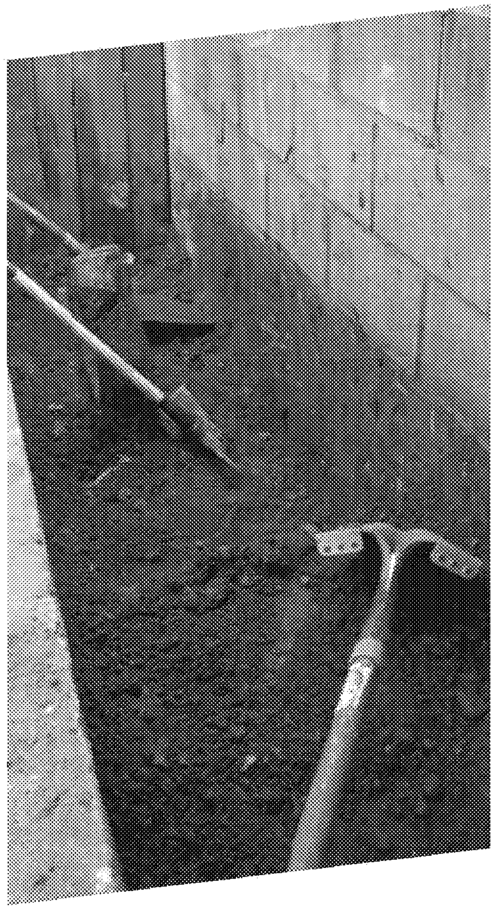

Removal Action Plan (Cleanup Plan)

Offsite Properties within the Exide Preliminary Investigation Area

July 17, 2017

Prepared by:

URS

Prepared for:

California Department of Toxic Substances Control

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REMOVAL ACTION PLAN

(CLEANUP PLAN)

OFFSITE PROPERTIES WITHIN THE EXIDE PRELIMINARY INVESTIGATION AREA

Prepared for

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8800 Cal Center Drive
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July 17, 2017

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Department of Toxic Substance Control
REMOVAL ACTION PLAN (CLEANUP PLAN) APPROVAL RECORD

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7/17/2017
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REMOVAL ACTION PLAN (CLEANUP PLAN)
OFFSITE PROPERTIES WITHIN THE EXIDE PRELIMINARY INVESTIGATION AREA

On behalf of the Department of Toxic Substances Control (DTSC), URS Corporation has prepared this Removal Action Plan (Cleanup Plan) for the cleanup of properties within the Preliminary Investigation Area surrounding the former Exide Technologies, Inc. battery recycling facility.

This plan was prepared in a manner consistent with the level of care and skill exercised by professional engineers, geologists, and environmental scientists, under the technical direction of the undersigned.

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LIST OF ACRONYMS

AGC	Advanced GeoServices Corporation
APN	Assessor's Parcel Number
ARAR	Applicable or relevant and appropriate requirements
bgs	Below ground surface
BMPs	Best management practices
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
CSM	Conceptual Site Model
DHS	Department of Health Services
DTSC	Department of Toxic Substances Control
DU	Decision Unit
EIR	Environmental Impact Report
Exide	Exide Technologies, Inc.
HEPA	high efficiency particulate air
HERO	Human and Ecological Risk Office
HHRA	Human Health Risk Assessment
HSAA	Carpenter-Presley-Tanner Hazardous Substances Account Act
HWCL	Hazardous Waste Control Law
IC	Institutional Controls
IRMW	Interim Remedial Measures Work Plan
LACPHD	Los Angeles County Public Health Department
LATTC	Los Angeles Trade Technical College
LAUSD	Los Angeles Unified School District
LOC	Letter of Completion
LUC	land use covenant
MEIR	maximum exposed individual resident
µg/dL	micrograms per deciliter
mg/kg	milligrams per kilogram
MMRP	Mitigation Monitoring and Reporting Program
NCP	National Contingency Plan
NOP	Notice of Preparation
NRCS	National Resources Conservation Service
O&M	operations and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
Pb	Lead
PIA	Preliminary Investigation Area
PPE	Personal protective equipment

ppm	parts per million
PT&R Guidance	Proven Technologies and Remedies Guidance
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/ Feasibility Study
Ro	Ramona Loam
SCAQMD	South Coast Air Quality Management District
SL	DTSC Screening Level
TBC	To be considered
TCRA	Time Critical Removal Action
TERP	Transportation Emergency Response Plan
UCL	Upper confidence limit
UCLA-LOSH	University of California Los Angeles Labor Occupational Safety and Health
USEPA	United States Environmental Protection Agency
WERC	Workforce for Environmental Restoration in Communities
XRF	X-Ray fluorescence

EXECUTIVE SUMMARY

The Department of Toxic Substances Control (DTSC) has prepared this Removal Action Plan (Cleanup Plan)[1] for this phase of cleanup of lead-impacted soil in communities surrounding the former Exide Technologies, Inc. (Exide) Battery Recycling Facility, located in Vernon, California, also known as the Preliminary Investigation Area (PIA). This Cleanup Plan is the latest and most significant step that DTSC has taken to protect the people who live in the communities around the former Exide Facility, especially sensitive individuals, including children and pregnant women.

DTSC has worked with and listened to the public in affected communities, local and federal government officials, public health officials, cleanup experts for other lead-impacted residential properties located across the country, and others in implementing protections for people in these communities. DTSC used its experience, legal authorities, and input from the public and others in rejecting a permit for the Exide Facility and ordering the facility to close, and in ordering Exide to sample soil for contamination in communities around its facility, and to clean up residential areas closest to its facility. DTSC has ensured that hundreds of sensitive land use properties (i.e., residences, schools, parks, day care centers, and child care facilities) have already been cleaned up and, as of June 30, 2017, approximately 9,000 sensitive land use properties within the PIA have been sampled for lead and other heavy metals. DTSC will use the $176.6 million loan of state funds requested by Governor Edmund G. Brown, Jr. and authorized by legislation to move this Cleanup Plan forward. This Cleanup Plan represents the next step in cleaning up lead-impacted soil at sensitive land use properties around the former Exide Facility.

This Cleanup Plan summarizes soil sampling results from sensitive land use properties within the PIA, describes cleanup objectives, identifies and reviews potential cleanup technologies, evaluates cleanup alternatives, and identifies the preferred cleanup alternative for the cleanup of lead-contaminated soil at sensitive land use properties within the PIA. After considering all comments received, DTSC has selected and will implement the preferred cleanup alternative in a manner consistent with the criteria in Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 C.F.R. Part 300), as amended (the National Contingency Plan or NCP), and the U.S. Environmental Protection Agency (USEPA) Superfund Lead-Contaminated Residential Site Handbook.

This Cleanup Plan presents an evaluation of cleanup alternatives consistent with USEPA's *Interim Final, Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (USEPA, 1988) and the guidelines contained in the *Proven Technologies and Remedies (PT&R) Guidance for Remediation of Metals in Soil* (DTSC, 2008). This Cleanup Plan describes the selected cleanup alternative and includes a conceptual design applicable to sensitive land use properties in the PIA.

[1] This plan was previously referred to as the Remedial Action (Cleanup) Plan. For an explanation of the name change, see Final Environmental Impact Report, Section 2.2 *Master Responses to Comments* (Master Response 1). (Appendix L.)

A lead recycling facility operated at the former Exide Facility property from 1922 until March 2014. Exide acquired the facility in 2000 and used the facility for lead recycling to recover lead from automotive batteries and other lead-bearing materials. In March 2014, Exide shut down its operations because it could not meet new rules enacted by the South Coast Air Quality Management District (SCAQMD), and has not operated since that date. According to the Revised AB 2588 Health Risk Assessment prepared for Exide in January 2013, Exide had intended to implement air pollution risk reduction measures required by SCAQMD and DTSC to restart operations at the facility in March 2015, but in January 2015, DTSC determined that the liner system under the containment building where Exide stored crushed battery feed material had failed. On January 30, 2015, DTSC ordered Exide to investigate the extent of contamination under the containment building so that Exide could implement any necessary corrective actions.

In February 2015, DTSC initiated the process of denying Exide's permit application. After a detailed review of the Exide's record and its Part B hazardous waste permit application, DTSC notified Exide that the facility could not operate in compliance with California's safeguards to protect public health and the environment. In March 2015, DTSC notified Exide that DTSC intended to deny Exide's Part B hazardous waste permit application and ordered Exide to withdraw its permit application, permanently cease operations, and close the facility in accordance with a DTSC-approved closure plan.

Activities conducted at the former Exide Facility that may have contributed to contamination of offsite properties within the PIA include battery breaking, smelting, refining lead, and storage, handling, and transportation of batteries, finished lead product, and other materials associated with lead recycling operations. These activities, which occurred for decades before environmental statutes or regulations existed and therefore were carried out without proper environmental control measures, may have contributed to releases of lead within the PIA.

In response to findings in a risk assessment prepared by Exide for SCAQMD, DTSC ordered Exide to conduct soil sampling in communities around the facility. The initial phase (Phase 1) assessment of lead concentrations in residential soil focused on two areas, collectively referred to as the "Initial Assessment Areas." DTSC ordered Exide to sample 19 residential properties in the Northern Initial Assessment Area (located in Boyle Heights and East Los Angeles) and 20 residential properties in the Southern Initial Assessment Area (located in Maywood) between August and November 2014. Concurrently with Phase 1 sampling, Exide conducted a preliminary background study in a residential area with similar urban and industrial characteristics as those around the former Exide Facility, approximately 14 miles to the south of the facility in Long Beach, California. Exide's study indicated that background lead concentrations in soil were below DTSC's screening level for lead in residential soils (80 milligrams per kilogram (mg/kg) or parts per million (ppm).

Because the Phase 1 soil sampling results from the Initial Assessment Areas exceeded background lead concentrations and DTSC's screening level for lead in residential soils, DTSC ordered Exide to perform soil cleanup of all residential properties with concentrations exceeding the residential screening criteria for lead in soils within the Initial Assessment Areas.[2] Under that order, Exide cleaned up 186 residential properties in the Initial Assessment Areas between August 2014 and November 2015.

DTSC also ordered Exide to conduct additional step-out sampling (Phase 2) within areas referred to as the Northern Expanded Assessment Area and Southern Expanded Assessment Area (collectively referred to as the "Expanded Assessment Areas"). In March 2014, Exide collected soil samples from 146 residential properties in the Expanded Assessment Areas. Many of the properties sampled during Phase 2 exceeded DTSC's screening level for lead in residential soils. DTSC ordered further sampling along dominant wind directions out to a distance of 4.5 miles from the former Exide Facility.

In April 2015, DTSC received Exide's final report of its sampling activities. After performing additional analysis of the samples and a thorough statistical review of the results, DTSC concluded that lead from Exide's operations may have extended as far as 1.3 to 1.7 miles from the facility, depending on direction. In August 2015, Governor Edmund G. Brown, Jr. directed $7 million in emergency funding to DTSC to implement Phase 3 assessment and cleanup, which included:

- Sampling up to 1,500 residential properties, parks, schools, day care centers, and child care facilities in communities surrounding the former Exide Facility;
- Developing a comprehensive cleanup plan; and
- Beginning cleanup of 50 of the highest priority properties based on the extent of lead contamination and the potential for exposure.

On November 12, 2015, DTSC issued an Imminent and Substantial Endangerment Determination (ISE) for the PIA, which is predominantly a residential area, based on elevated lead concentrations in surface soils in the PIA (Docket No. HAS-FY 15/16-054). From October 2015 through July 2016, DTSC cleaned up residential properties around the former Exide Facility with the highest concentrations of lead and the greatest potential risk to sensitive individuals such as young children and pregnant women pursuant to a *Final Offsite Interim Remedial Measures Work Plan (IRMW;* Parsons, 2015a). During this period, DTSC also sampled over 1,500 additional residential properties in the PIA.

In February 2016, Governor Brown requested appropriation of $176.6 million from the state general fund to expedite and expand testing and cleanup of all residential properties, schools, parks, day care centers, and child care facilities within the PIA. Legislation authorizing a $176.6 million loan for those purposes was passed in April 2016 (AB 118 (Santiago, Statutes of 2016); SB 93 (De León, Statutes of 2016)).

With this funding, DTSC increased sampling in the PIA. Additionally, in partnership with the Los Angeles Trade Technical College (LATTC) and the Labor Occupational Safety and Health program at the University of California Los Angeles (UCLA-LOSH), DTSC established a worker training program called the

[2] Stipulation and Order, Docket No. HWCA P3-12/13-010, OAH No. 2013050540.

"Workforce for Environmental Restoration in Communities" (WERC) program. This program provides local people with job skills training in cleanup activities and an opportunity to help restore their communities. A total of 49 community members received training and almost all program graduates were hired as sampling technicians by DTSC's sampling contractors. As of June 30, 2017, approximately 9,000 sensitive use properties in the PIA have been sampled.

Under this Cleanup Plan, cleanup of these properties would be determined based on the highest concentrations of lead and greatest potential risk to sensitive individuals. The Cleanup Plan maintains a target cleanup goal of properties with lead sampling results that exceed the representative soil lead concentration of 80 ppm. DTSC estimates that with presently available funding, DTSC can clean up approximately 2,500 of these sensitive land use properties within the PIA with the highest levels of lead and greatest potential health risk to sensitive individuals during this phase of the cleanup.

Initial prioritization for this cleanup phase is based on properties sampled within the PIA prior to June 30, 2017. For each property sampled, the results were statistically analyzed to determine a representative, property-wide lead level that is more health protective than a simple average of results. Using these sampling and analysis criteria for the initial prioritization, the Cleanup Plan provides for the following categories of properties within the PIA to be addressed during this phase of the cleanup:

- Residential properties with a representative soil lead concentration[3] of 400 ppm or higher; and
- Residential properties with a representative soil lead concentration of less than 400 ppm, but where any soil sampling result of 1,000 ppm or higher is detected; and
- Daycare and child care centers with a representative soil lead concentration of 80 ppm or higher that have not yet been cleaned up.

All parks and schools that require cleanup will be cleaned up during this phase. In addition, this phase of cleanup may address properties sampled between July 1, 2017, and December 31, 2017, that fall within the above categories.[4]

The Cleanup Plan assumes that sensitive individuals may be present at most properties within the PIA, which is predominantly a residential area. DTSC will identify properties for cleanup based on representative soil lead concentrations. Daycare centers, child care facilities, parks, and schools are particularly sensitive land use properties given the large number of sensitive individuals known to use these properties, particularly young children. There is potential for these sensitive individuals to be exposed to lead-contaminated soil while participating in activities at these properties. Accordingly, DTSC will clean up daycare centers and child care facilities with a representative soil lead concentration of 80 ppm or higher that have not yet been cleaned up. Additionally, all parks and schools that require

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[3] A representative soil lead concentration is determined by the 95 percent upper confidence limit (UCL) of the mean lead concentration in soil.

[4] DTSC may identify additional properties that have representative soil lead concentrations above DTSC's screening level for lead in residential soils of 80 ppm, but fall outside of the above categories, for cleanup if funding permits.

cleanup will be cleaned up during this phase. DTSC's sampling data as of June 30, 2017, indicate five (5) private schools, two (2) parks, and forty-six (46) daycare centers and child care facilities require cleanup or further assessment. Refer to Sections 2.1.2, 2.1.3 and 2.1.4 for further details.

DTSC will also clean up properties sampled prior to June 30, 2017, with a representative soil lead concentration of 400 ppm or higher. DTSC will determine the representative soil lead concentration by using the USEPA's ProUCL software. The representative soil lead concentration calculated by USEPA's ProUCL is a conservative and health protective approach that considers all sampling results, including the highest soil lead concentrations. Although higher than DTSC's target cleanup goal of 80 ppm, the cleanup of properties with a representative soil lead concentration of 400 ppm or higher achieves important health protection goals, consistent with other federal and state programs that protect residents from exposure to lead.[5] DTSC's sampling data as of June 30, 2017, indicate approximately 2,000 properties have representative soil lead concentrations of 400 ppm or higher.

DTSC will also ensure that properties with a representative soil lead concentration of less than 400 ppm, but that also have any soil sampling result of 1,000 ppm or higher that may result in a risk of localized exposure, are cleaned up in a manner that is protective of public health. To address the potential risk for exposure, DTSC will consider several factors, including, but not limited to, the levels of lead in soils largely at or near the surface that may migrate or pose potential exposure to people, especially sensitive individuals. DTSC's sampling data as of June 30, 2017, indicate there are approximately 250 properties meeting this criteria.

Finally, DTSC may clean up additional properties that were sampled from July 1 to December 31, 2017, and that fall within the categories discussed above.[6]

The cleanup objectives address the contaminant of concern (i.e., lead), exposure routes, populations, and acceptable or ranges of acceptable contaminant concentrations for each media of concern. The cleanup objectives reduce or eliminate the potential for ingestion, inhalation, and dermal or direct contact of lead-impacted soil.

As presented in Section 2.0 of this Cleanup Plan, environmental investigations conducted to date have documented the presence of lead in soil at properties throughout much of the PIA. The most likely populations to be exposed to lead in soil at properties within the PIA are the residents and those who

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[5] USEPA uses a representative lead concentration of 400 ppm as a regional screening level for residential lead exposure and to identify residential properties that may require cleanup. In addition, the California Department of Public Health (CDPH) lead abatement certification program standards define "lead-contaminated soil" as soil in children's play areas that contains lead equal to or in excess of 400 ppm, for the purposes of lead-related construction.

[6] DTSC may identify additional properties that have representative soil lead concentrations above DTSC's screening level for lead in residential soils of 80 ppm, but fall outside of the above categories, for cleanup if funding permits.

frequent parks and schools. The current and future exposure routes to lead include ingestion, inhalation, and dermal contact.

The following cleanup objectives are designed to address the impacts associated with lead-impacted soil at properties within the PIA and reduce or eliminate the potential for exposure:

- Promptly clean up sensitive land use properties in the PIA in a manner that will achieve a cleanup goal that is protective of public health and the environment.
- Protect the current and future health of the residential population from exposure to lead in soil that presents an unacceptable risk to sensitive individuals through ingestion, inhalation, and dermal or direct contact.
- Restore disturbed soils to a condition compatible with the existing and reasonably anticipated future land use.
- Minimize the volume of lead-impacted soil to be disposed in a landfill.
- Minimize, to the extent practicable, the need for land use controls.
- Minimize short-term adverse impacts to the residential community due to fugitive dust and soil transport.

DTSC evaluated cleanup technologies, including soil washing, stabilization, and phytoremediation, for their feasibility, applicability to the project, and the need to quickly cleanup lead-impacted soil. Soil washing and stabilization were evaluated as promising technologies for volume reduction and waste minimization, but required a property-specific treatability study to determine if they will successfully remediate lead in soil in the PIA. Based on this evaluation, the following cleanup alternatives were developed:

- **Alternative 1** – No Action.

  DTSC is required by law to evaluate a No Action alternative. This alternative proposes to take "no action," which means the proposed cleanup would not take place. The environmental effects resulting from taking no action serve as a baseline condition, and effects of the proposed cleanup or an alternative cleanup are compared to this baseline condition.

- **Alternative 2** – Lead Hazard Removal and Offsite Disposal.

  Excavation of soil in six (6)-inch layers until post-remediation exposure concentrations for the property are less than a **representative soil lead concentration of 400 ppm** or a maximum depth of 18 inches is excavated. Soil removed would be disposed of at an offsite facility (i.e., landfill) authorized to manage lead-impacted soil. Properties would be backfilled with clean fill material and covered with surface landscape material (e.g., decomposed granite, mulch, or sod). Soils that are currently covered with hardscape such as concrete, pavement, or other structures would be considered to be isolated from exposure to humans and would not be cleaned up.

- **Alternative 3** – Risk-Based Removal and Offsite Disposal.

Excavation of soil in six (6)-inch layers until post-remediationexposure concentrations for the property are less than a **representative soil lead concentration of 80 ppm** or a maximum depth of 18 inches is excavated. Soil removed would be disposed of at an offsite facility (i.e., landfill) authorized to manage lead-impacted soil. Properties would be backfilled with clean fill material and covered with surface landscape material (e.g., decomposed granite, mulch, or sod). Soils that are currently covered with hardscape such as concrete, pavement, or other structures would be considered to be isolated from exposure to humans and would not be cleaned up.

DTSC's selection of Alternative 3, the preferred alternative, was informed by CERCLA's nine-criteria analysis in the NCP and removal action selection criteria under the NCP (40 CFR 300.415; see also *Proven Technologies and Remedies Guidance - Remediation of Metals in Soil* (DTSC, 2008). The evaluation of alternatives, contained in Section 5.0 of this Cleanup Plan, identifies Alternative 3 – *Risk- Based Removal and Offsite Disposal* as the selected action. Alternative 3 consists of the following components:

- Securing of necessary permits and access agreements for soil removal and remediation;
- Excavation of soils containing elevated concentrations of lead at properties within the PIA meeting the criteria included in this Cleanup Plan;
- Excavations against houses, garages, outbuildings, driveways, sidewalks, structural perimeter walls, fences, and patios will be benched as necessary, to avoid undermining structures;
- Removal activities will not occur under hardscape, decks, or areas not readily accessible by residents;
- If a planter is not structurally sound, the planter will be removed with the property owner's concurrence;
- Small shrubs and other plantings less than four (4) feet in height (excluding trees and established shrubs) will be removed and disposed offsite with the property owner's concurrence;
- Areas around trees and established shrubs will be excavated to approximately six (6) inches below ground surface within the drip zone to avoid root damage;
- Areas within approximately six (6) inches of underground utilities will not be disturbed to prevent damage to the appurtenances;
- Best management practices (BMPs) will be used to prevent storm water run-on or run-off and to minimize dust generation;
- Project Design Features (PDFs) have been developed for the project and will be used to avoid or minimize impact to the community and the environment (Appendix L);
- Soil will be stockpiled on top of plastic sheeting adjacent to excavation areas and transferred to a haul truck expeditiously. Stockpiles will be maintained in areas that minimize access by and inconvenience to residents. If stockpiles of lead-impacted soil or surface excavations are left overnight, the exposed portion will be covered with plastic to reduce dust emissions. The plastic will be labeled with the contents of the stockpile and signs indicating the contents will be placed adjacent to the stockpile facing the street for passers-by;
- Lead-impacted soil will be disposed of at an appropriately permitted disposal facility (i.e., landfill);

- Confirmation sampling, waste characterization sampling, and air monitoring will be conducted to verify proper implementation of the cleanup activities;
- Confirmation sampling of backfill will be conducted in accordance with DTSC's import fill guidance (DTSC, 2008);
- Site restoration will depend on what top cover the property owner selects (decomposed granite, mulch, sod, or combination thereof) and its relative availability;
- Structural backfill will be placed at depths of six (6) to 18 inches;
- The top six (6) inches of ground surface will include topsoil backfill covered with either mulch decomposed granite, sod, or a combination thereof; and
- Offer to residents the option to relocate while lead-contaminated soil is excavated and removed from their properties and the option to have an interior cleaning by high efficiency particulate air (HEPA) vacuum performed after field activities have been completed.

Following the completion of cleanup activities for each property, the cleanup contractor will prepare and submit a Letter of Completion (LOC) for DTSC's review and approval. Once DTSC approves the LOC, it will be provided to the property owner and tenant, if requested, to document the cleanup activities that were completed at the property. The LOC will provide an overview of the project and may include the following:

- Pre-Excavation Activities: copies of the signed access agreement(s); initial visit evaluation; identification and documentation of the presence of air ducts; documentation of interior cleaning requests; Pro UCL 5.1 (or latest version) output for the property; CDPH Abatement of Lead Hazards Evaluation Notification Form 8551 and Lead Hazard Evaluation Report Form 8552 or later versions; and applicable permits and utility clearances.
- Field Work Documentation: copies of laboratory reports presenting results from XRF field measurements and fixed laboratory analyses of soil samples; figures illustrating work areas and sample locations; photographic chronology of field work; and confirmation sampling results.
- Post-Cleanup and Restoration: Compensation Acknowledgement Forms; backfill compaction results; and Post-Cleanup Evaluation for Lead.

LOCs will be signed and stamped by a Lead Certified Industrial Hygienist and a California-Licensed Civil Engineer.

A schedule for implementation of the preferred cleanup alternative is presented in Section 8.0 of this Cleanup Plan.

A formal public comment period[7] on the Draft Cleanup Plan, originally scheduled to run from December 15, 2016, through January 31, 2017, was extended in response to requests from stakeholders. The public comment period ran from December 15, 2016 through February 15, 2017. Notice of the public comment period and public meetings on the Draft Cleanup Plan was published in the Eastside Sun newspaper on December 15, 2016. A Public Notice was mailed to the Exide mailing list and sent electronically to those on the Exide Listserv on December 14, 2016, which provided information on how to access the Draft Cleanup Plan as well as links to key technical documents, and information on the three public meetings to be held in the Los Angeles Area.

A second notice was sent on January 8, 2017, to remind the public about the three (3) scheduled public meetings and the locations. A web based portal and email account was established for commenters to provide comments online. Written and verbal comments were also received at the public meetings held on the following dates and locations:

Wednesday, January 11, 2017	Thursday, January 19, 2017	Saturday, January 28, 2017
Our Lady of Victory Church 1316 S Herbert Avenue Los Angeles, CA 90023	Maywood City Council Chambers 4319 East Slauson Avenue Maywood, CA 90270	Boyle Heights Resurrection Church 3324 Opal Street Los Angeles, CA 90023

[7] Public outreach for the Cleanup Plan is described at length in the Final Environmental Impact Report, Section 2.2 *Master Responses to Comments* (Master Response 6). (Appendix L)

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RESUMEN EJECUTIVO

El Departamento de Control de Sustancias Tóxicas (DTSC, por sus siglas en inglés) ha preparado este Plan de Acción de Remoción (Plan de Limpieza)[8] para esta fase de limpieza de suelo impactado por plomo en comunidades que rodean la antigua Instalación de Reciclaje de Baterías de Exide Technologies, Inc. (Exide), ubicada en Vernon, California, conocida también como el Área de Investigación Preliminar (PIA, por sus siglas en inglés). Éste Plan de Limpieza es el paso más reciente y más significativo que DTSC ha tomado para proteger a la gente que vive en las comunidades alrededor de la antigua Instalación de Exide, en especial los individuos sensibles, incluyendo niños pequeños y mujeres embarazadas.

DTSC ha laborado con y escuchado al público en las comunidades afectadas, funcionarios del gobierno local y federal, funcionarios de salud pública, expertos en limpieza para otras propiedades residenciales afectadas por el plomo en todo el país y otros en la implementación de protecciones para la gente en estas comunidades. El DTSC usó su experiencia, a las autoridades legales y retroalimentación del público y otros para rechazar un permiso para la Planta de Exide y ordenar el cierre de la planta, y para ordenar a Exide muestrear el suelo en busca de contaminación en comunidades que están alrededor de su planta y limpiar las áreas residenciales más cercanas a su planta. El DTSC se ha asegurado de que cientos de propiedades con uso de tierra sensible (es decir, residencias, escuelas, parques, guarderías e instalaciones de cuidado infantil) ya se hayan limpiado y de que para el 30 de junio de 2017 aproximadamente 9,000 propiedades con uso de tierra sensible dentro del PIA se hayan muestreado en busca de plomo y otros metales pesados. El DTSC usará el préstamo de fondos del estado de $176.6 millones solicitado por el Gobernador Edmund G. Brown, Jr., y autorizado por la legislación para llevar a cabo este Plan de Limpieza. Este Plan de Limpieza representa el siguiente paso en la limpieza de suelo impactado por plomo en propiedades con uso de tierra sensible que se encuentran alrededor de la antigua Planta de Exide.

Este Plan de Limpieza resume los resultados de muestreo del suelo de propiedades con uso de tierra sensible que se encuentran dentro del PIA, describe los objetivos de limpieza, identifica y revisa las tecnologías de limpieza potenciales, evalúa las alternativas de limpieza e identifica la alternativa de limpieza preferida para la limpieza de suelo contaminado con plomo en propiedades con uso de tierra sensible que se encuentran dentro del PIA. Después de considerar todos los comentarios recibidos, el DTSC ha seleccionado e implementará la alternativa de limpieza preferida de manera congruente con los criterios de la Subparte E del Plan Nacional de Contingencia de Contaminación de Petróleo y Sustancias Peligrosas (40 C.F.R. Parte 300), en vigor (el Plan Nacional de Contingencia o NCP, por sus siglas en inglés) y el Manual de Sitios Residenciales Contaminados con Plomo Superfund de la Agencia de Protección Ambiental de EE. UU. (USEPA, por sus siglas en inglés).

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[8] A este plan se hizo referencia previamente como el Plan de Acción de Remedio (Limpieza). Para una explicación del cambio de nombre, ver, el Informe Final de Impacto Ambiental, Sección 2.2 *Respuestas Maestras a los Comentarios* (Respuesta Maestra 1). (Apéndice N.)

Este Plan de Limpieza presenta una evaluación de alternativas de limpieza congruentes con la *Guía Final Interina para Realizar Investigaciones de Remedio y Estudios de Viabilidad de la USEPA de acuerdo con la Ley Completa de Respuesta Ambiental, Compensación y Responsabilidad* (CERCLA, por sus siglas en inglés) [USEPA, 1988] y las directrices contenidas en la *Guía de Tecnologías y Remedios Comprobados (PT&R, por sus siglas en inglés) para Remedio de Metales en el Suelo* (DTSC, 2008). Este Plan de Limpieza describe la alternativa de limpieza seleccionada e incluye un diseño conceptual aplicable a propiedades con uso de tierra sensible en el PIA.

Una planta de reciclaje de plomo operó en la antigua Planta de Exide de 1922 a marzo de 2014. Exide adquirió la planta en 2000 y la uso para reciclaje de plomo para recuperar plomo de baterías de autos y otros materiales que contenían plomo. En marzo de 2014, Exide cerró sus operaciones, ya que no podía cumplir con las nuevas reglas impuestas por el Distrito de la Costa Sur de Manejo de Calidad del Aire (SCAQMD, por sus siglas en inglés) y no ha operado desde esa fecha. De acuerdo con la Evaluación Revisada de Riesgos para la Salud AB 2588 preparada por Exide en enero de 2013, Exide había intentado implementar las medidas de reducción de contaminación del aire requeridas por el SCAQMD y el DTSC para reanudar operaciones de la planta en marzo de 2015, pero en enero de 2015 el DTSC determinó que el sistema de forro bajo el edificio de contención en el que Exide almacenaba el material de alimentación de baterías trituradas había fallado. El 30 de enero de 2015 el DTSC ordenó a Exide investigar la medida de la contaminación debajo del edificio de contención, de modo que Exide pudiera implementar cualesquier medidas correctivas. En febrero de 2015 el DTSC inició el proceso de rechazar la solicitud de permiso de Exide. Después de una revisión detallada del registro de la planta y la solicitud de permiso de residuos peligrosos Parte B de Exide, el DTSC notificó a Exide que la planta no podía operar en cumplimiento de las salvaguardas de California para proteger la salud pública y el ambiente. En marzo de 2015, el DTSC ordenó a Exide retirar su solicitud de permiso y dar aviso al DTSC de la intención de Exide de cerrar su planta permanentemente.[9] La antigua Planta de Exide se someterá a clausura de acuerdo con las secciones 25100 y subsecuentes del Código de Salud y Seguridad de la Ley de Control de Residuos Peligrosos (HWCL, por sus siglas en inglés) de California y sus regulaciones de implementación, el Código de Regulaciones de California, título 22, división 4.5, secciones 66260.1 y subsecuentes, según se describe en el Plan de Clausura de la Planta de Exide (AGC, 2015) según ha sido modificada y aprobada por el DTSC el 8 de diciembre de 2016.

Entre las actividades realizadas en la antigua Planta de Exide que pueden haber contribuido a la contaminación de propiedades fuera del sitio dentro del PIA se incluyen trituración de baterías, fundido, refinación de plomo y almacenamiento, manejo y transporte de baterías, producto terminado de plomo y otros materiales relacionados con las operaciones de reciclaje de plomo. Estas actividades, que ocurrieron durante décadas antes de que existieran los estatutos y las regulaciones ambientales y que, por lo tanto, se realizaron sin medidas apropiadas de control ambiental pueden haber contribuido a la

[9] Estipulación y Orden que modifica la Estipulación y Orden de Vernon 2014, Cédula No. 2014-6489.

liberación de plomo dentro del PIA.

En respuesta a los hallazgos de una evaluación de riesgos preparada por Exide para el SCAQMD, el DTSC ordenó a Exide realizar muestreo de suelos en comunidades que están alrededor de la planta. La evaluación de la fase inicial (Fase 1) de concentraciones de plomo en suelo residencial se enfocó en dos áreas, referidas colectivamente como las "Áreas de Evaluación Inicial". El DTSC ordenó a Exide muestrear 19 propiedades residenciales en el Área Norte de Evaluación Inicial (ubicada en Boyle Heights y el Este de Los Ángeles) y 20 propiedades residenciales en el Área Sur de Evaluación Inicial (ubicada en Maywood) entre agosto y noviembre de 2014. De manera concurrente con el muestreo de la Fase 1, Exide realizó un estudio preliminar de antecedentes en un área residencial son características urbanas e industriales similares a aquellas encontradas alrededor de la antigua Planta de Exide, aproximadamente 14 millas al sur de la planta en Long Beach. California. El estudio de Exide indicó que las concentraciones de plomo en el suelo de los antecedentes estaban por debajo del nivel de detección del DTSC para plomo en suelos residenciales (80 miligramos por kilogramo [mg/kg] o partes por millón [ppm]).

Dado que los resultados de muestreo del suelo de la Fase 1 de las Áreas de Evaluación Inicial excedieron las concentraciones de plomo de los antecedentes y el nivel de detección del DTSC para plomo en suelos residenciales, el DTSC ordenó a Exide realizar la limpieza de suelo de todas las propiedades residenciales con concentraciones que exceden los criterios de detección residencial para plomo en suelos dentro de las Áreas de Evaluación Inicial.[10] Bajo esa orden, Exide limpió 186 propiedades residenciales en las Áreas de Evaluación Inicial entre agosto de 2014 y noviembre de 2015.

El DTSC también ordenó a Exide realizar muestreo adicional por pasos (Fase 2) dentro de las áreas referidas como el Área Norte de Evaluación Ampliada y el Área Sur de Evaluación Ampliada (referidas colectivamente como las "Áreas de Evaluación Expandida"). En marzo de 2014, Exide recolectó muestras de suelo de 146 propiedades residenciales en las Áreas de Evaluación Ampliada. Muchas de las propiedades muestreadas durante la Fase 2 excedieron el nivel de detección del DTSC para plomo en suelos residenciales. El DTSC ordenó más muestreos junto con las direcciones dominantes del viento a una distancia de 4.5 millas de la antigua Planta de Exide.

En abril de 2015 el DTSC recibió el informe final de Exide sobre sus actividades de muestreo. Después de realizar un análisis adicional de las muestras y una completa revisión estadística de los resultados, el DTSC concluyó que el plomo de las operaciones de Exide puede haberse extendido a hasta 1.3 a 1.7 millas de la planta, según la dirección. En agosto de 2015, el Gobernador Edmund G. Brown, Jr., ordenó $7 millones en fondos de emergencia para el DTSC para implementar la evaluación y limpieza de la Fase 3, que incluían:

- Muestreo de hasta 1,500 propiedades residenciales, parques, escuelas, guarderías e instalaciones de cuidado infantil en comunidades que rodean la antigua Planta de Exide;

[10] Estipulación y Orden, Cédula No. HWCA P3-12/13-010, OAH No. 2013050540.

- Desarrollo de un plan de limpieza exhaustivo; e
- Inicio de la limpieza de 50 de las propiedades de mayor prioridad con base en la extensión de contaminación por plomo y el potencial de exposición.

El 12 de noviembre de 2015, el DTSC emitió una Determinación de Peligro Inminente y Sustancial (ISE, por sus siglas en inglés) para el PIA, que es de manera predominante un área residencial, con base en las concentraciones elevadas de plomo en suelos superficiales dentro del PIA. (Cédula No. HAS-FY 15/16-054.) De octubre de 2015 a Julio de 2016, el DTSC limpió propiedades residenciales alrededor de la antigua Planta de Exide con las más altas concentraciones de plomo y el mayor riesgo potencial para individuos sensibles, como niños pequeños y mujeres embarazadas de acuerdo con un *Plan Final de Medidas de Remedio Interino Fuera del Sitio (IRMW, por sus siglas en inglés;* Parsons, 2015a). Durante este periodo, el DTSC muestreó más de 1,500 propiedades residenciales adicionales en el PIA.

En febrero de 2016, el Gobernador Brown solicitó la apropiación de $176.6 millones del fondo general estatal para agilizar y ampliar las pruebas y la limpieza de todas las propiedades residenciales, escuelas, parques, guarderías e instalaciones de cuidado infantil dentro del PIA. La legislación que autorizó un préstamo de $176.6 millones para esos fines fue aprobada en abril de 2016 (AB 118 [Santiago, Estatutos de 2016]); SB 93 (De León, Estatutos de 2016).

Con este financiamiento el DTSC aumentó el muestreo en el PIA. Además, en sociedad con el Colegio Técnico de Oficios de Los Ángeles (LATTC, por sus siglas en inglés) y el programa de Seguridad y Salud Ocupacional Laboral de la Universidad de California en Los Ángeles (UCLA-LOSH, por sus siglas en inglés), el DTSC estableció el programa de capacitación de trabajadores llamado programa de “Fuerza de Trabajo para Restauración Ambiental en Comunidades” (WERC, por sus siglas en inglés). Este programa proporciona a las personas locales capacitación en habilidades de trabajo en actividades de limpieza y una oportunidad para ayudar a restaurar sus comunidades. Un total de 49 miembros de la comunidad recibieron capacitación y casi todos los graduados del programa fueron contratados como técnicos de muestreo por los contratistas de muestreo del DTSC. Al 30 de junio de 2017, se han muestreado aproximadamente 9,000 propiedades de uso sensible en el PIA.

De acuerdo con este Plan de Limpieza, la limpieza de estas propiedades se determinaría con base en las concentraciones más elevadas de plomo y el mayor riesgo potencial para individuos sensibles. El Plan de Limpieza mantiene una meta objetivo de limpieza con resultados de muestreo de plomo que exceden la concentración de plomo en el suelo de 80 ppm. El DTSC estima que con el financiamiento actualmente disponible, el DTSC puede limpiar aproximadamente 2,500 de estas propiedades de uso de tierra sensible dentro del PIA con los más altos niveles de plomo y el mayor riesgo potencial para la salud de individuos sensibles durante esta fase de limpieza.

La priorización inicial para esta fase de limpieza se basa en las propiedades muestreadas dentro del PIA antes del 30 de junio de 2017. Para cada propiedad muestreada, los resultados se analizaron estadísticamente para determinar un nivel representativo de toda la propiedad que protege más la salud que un simple promedio de resultados. Usando estos criterios de muestreo y análisis para la priorización inicial, el Plan de Limpieza proporciona las siguientes categorías de propiedades dentro del PIA para ser atacadas durante esta fase de la limpieza:

- Propiedades residenciales con una concentración representativa de plomo en el suelo[11] de 400 ppm o más; y
- Las propiedades residenciales con una concentración representativa de plomo en el suelo de menos de 400 ppm, pero en las que se detecta cualquier resultado de muestreo del suelo de 1,000 ppm o más; y
- Las guarderías y centros de cuidado infantil con una concentración representativa de plomo en el suelo de 80 ppm o más que no hayan sido limpiadas aún.

Todos los parques y escuelas que requieran limpieza se limpiarán durante esta fase. Además, esta fase de limpieza puede atacar propiedades muestreadas entre el 1 de julio de 2017 y el 31 de diciembre de 2017 que caigan dentro de las categorías anteriores.

El Plan de Limpieza considera que puede haber individuos sensibles presentes en la mayoría de las propiedades que están dentro del PIA, que es predominantemente un área residencial. El DTSC identificará las propiedades para limpieza con base en las concentraciones representativas de plomo en el suelo. Las guarderías, instalaciones de cuidado infantil, parques y escuelas son particularmente propiedades con uso de tierra sensible, dado el alto número de individuos sensibles que se sabe que emplean estas propiedades, en especial niños pequeños. Existe el potencial de que estos individuos sensibles sean expuestos a suelo contaminado con plomo mientras participen en actividades en estas propiedades. En consecuencia, el DTSC limpiará las guarderías y las instalaciones de cuidado infantil con una concentración representativa de plomo en el suelo de 80 ppm o más que aún no se hayan limpiado. Además, todos los parques y escuelas que requieran limpieza se limpiarán durante esta fase. Los datos de muestreo del DTSC al 30 de junio de 2017 indican cinco (5) escuelas privadas, dos (2) parques y cuarenta y seis (46) guarderías e instalaciones de cuidado infantil que requieren limpieza o mayor evaluación. Consultar las secciones 2.1.2, 2.1.3 y 2.1.4 para mayores detalles.

El DTSC limpiará propiedades muestreadas antes del 30 de junio de 2017 con una concentración representativa de plomo en suelo de 400 ppm o más. El DTSC determinará la concentración representativa de plomo en suelo usando el software ProUCL de la USEPA. La concentración representativa de plomo en suelo calculada por el ProUCL de la USEPA es un enfoque conservador y protector de la salud que considera todos los resultados de muestreo, incluyendo las concentraciones más elevadas de plomo en el suelo. Aunque mayor que la meta objetivo de limpieza del DTSC de 80 ppm, la limpieza de propiedades con una concentración representativa de plomo en suelo de 400 ppm o más logra importantes metas de protección de la salud, congruentes con otros programas federales y

[11] La concentración representativa de plomo en el suelo se determina por el límite superior de confianza (UCL, por sus siglas en inglés) del 95 por ciento de la concentración media de plomo en el suelo.

estatales que protegen a los residentes de la exposición a plomo.[12] El muestreo del DTSC al 30 de junio de 2017 indica aproximadamente 2,000 propiedades que tienen concentraciones representativas de plomo en suelo de 400 ppm o más.

El DTSC también se asegurará de que las propiedades con una concentración representativa de plomo en suelo de menos de 400 ppm, pero que también tienen cualquier resultado de muestreo del suelo de 1,000 ppm o más que pueden dar como resultado una exposición localizada, se limpien de manera que se proteja la salud pública. Para atacar el riesgo potencial de exposición, el DTSC considerará diversos factores, incluyendo, pero no limitados a, los niveles de plomo en suelos principalmente en o cerca de la superficie que puedan migrar o representar una exposición potencial para las personas, especialmente individuos sensibles. Los datos de muestreo del DTSC al 30 de junio de 2017 indican que hay aproximadamente 250 propiedades que cumplen con estos criterios.

Finalmente, el DTSC puede limpiar propiedades adicionales muestreadas del 1 de julio al 31 de diciembre de 2017 y que caigan dentro de las categorías discutidas antes.

Los objetivos de limpieza atacan el contaminante de interés (es decir, plomo), rutas de exposición, población y concentraciones de contaminante aceptables o rangos de concentraciones de contaminante aceptables para cada medio de interés. Los objetivos de limpieza reducen o eliminan el potencial de ingestión, inhalación o contacto dérmico o directo del suelo impactado por plomo.

Como se presenta en la Sección 2 de este Plan de Limpieza, las investigaciones ambientales realizadas a la fecha han documentado la presencia de plomo en el suelo en propiedades en gran parte del PIA. Las poblaciones con mayor probabilidad de estar expuestas al plomo en propiedades que están dentro del PIA son los residentes y quienes frecuentan parques y escuelas. Las rutas de exposición a plomo actuales y futuras incluyen ingestión, inhalación y contacto dérmico.

Los siguientes objetivos de limpieza están diseñados para atacar los impactos asociados con suelo impactado por plomo en propiedades que están dentro del PIA y reducir o eliminar el potencial de exposición:

- Limpiar rápidamente las propiedades con uso de tierra sensible en el PIA de manera que se alcanzarían las metas de limpieza que protegen la salud pública y el ambiente.
- Proteger la salud actual y futura de la población residencial de la exposición a plomo en el suelo que presente un riesgo inaceptable para individuos sensibles a través de la ingestión, la inhalación y contacto directo o con la piel.

[12] La USEPA usa una concentración representativa de plomo de 400 ppm como nivel regional de detección para exposición residencial a plomo e identifica las propiedades residenciales que pueden requerir limpieza. Además, las normas de certificación de mitigación de plomo del Departamento de Salud Pública de California (CDPH, por sus siglas en inglés) definen “suelo contaminado con plomo” como suelo en áreas de juego para niños que contiene plomo igual o mayor de 400 ppm para fines de construcción relacionada con plomo.

- Restaurar los suelos alterados a una condición compatible con el uso de tierra actual y el uso de tierra futuro razonablemente anticipado.
- Minimizar el volumen de suelo impactado por plomo que se desechará en rellenos sanitarios.
- Minimizar, en la medida que resulte práctica, la necesidad de controles de uso de tierra.
- Minimizar los impactos adversos de corto plazo a la comunidad residencial debidos al polvo fugitivo y el transporte de suelo.

El DTSC evaluó tecnologías de limpieza, incluyendo lavado del suelo, estabilización y fitorremedio, en cuanto a su viabilidad, aplicabilidad al proyecto y la necesidad de limpiar rápidamente el suelo impactado por plomo. El lavado y la estabilización de suelos se evaluaron como tecnologías prometedoras para la reducción de volumen y minimización de desechos, pero requerían un estudio de tratabilidad específico para las propiedades para determinar si remediarían exitosamente el plomo en el suelo dentro del PIA. Con base en esta evaluación, se desarrollaron las siguientes alternativas de limpieza:

- **Alternativa 1** – Ninguna Acción.
  El DTSC está obligado por ley a evaluar una alternativa de Ninguna Acción. Esta alternativa propone "no tomar ninguna acción", lo cual significa que no ocurriría la limpieza propuesta. Los efectos ambientales resultantes de no tomar ninguna acción sirven como condición de línea de base y los efectos de la limpieza propuesta o una limpieza alternativa se comparan a esta condición de línea de base.

- **Alternativa 2** – Eliminación del riesgo de plomo y desecho fuera del sitio.
  Excavación del suelo en capas de seis (6) pulgadas hasta que las concentraciones de exposición posteriores al remedio para la propiedad sean menores que una **concentración representativa de plomo en el suelo de 400 ppm** o se excave una profundidad máxima de 18 pulgadas. El suelo removido se desecharía en una instalación fuera del sitio (es decir, un relleno) autorizado para manejar suelo impactado por plomo. Las propiedades se rellenarían con material de relleno limpio y cubiertas con material de paisaje superficial (por ejemplo, granito descompuesto, cubierta orgánica o césped). Los suelos que actualmente están cubiertos con materiales duros como concreto, pavimento u otras estructuras se considerarían aisladas de la exposición para humanos y no se limpiarían.

- **Alternativa 3** – Remoción basada en el riesgo y desecho fuera del sitio.

  Excavación del suelo en capas de seis (6) pulgadas hasta que las concentraciones de exposición posteriores al remedio para la propiedad sean menores que una **concentración representativa de plomo en el suelo de 80 ppm** o se excave una profundidad máxima de 18 pulgadas. El suelo removido se desecharía en una instalación fuera del sitio (es decir, un relleno) autorizado para manejar suelo impactado por plomo. Las propiedades se rellenarían con material de relleno limpio y cubiertas con material de paisaje superficial (por ejemplo, granito descompuesto, cubierta orgánica o césped). Los suelos que actualmente están cubiertos con materiales duros como concreto, pavimento u otras estructuras se considerarían aisladas de la exposición para humanos y no se limpiarían.

La selección del DTSC de la Alternativa 3, la alternativa preferida, fue informada por el análisis de nueve criterios de CERCLA en el NCP y los criterios de selección de acción de remoción de acuerdo con el NCP (40 CFR 300.415; ver también *Tecnologías probadas y guía de remedios – Remedio de metales en el suelo* [DTSC, 2008]). La evaluación de alternativas, contenida en la Sección 5 de este Plan de Limpieza, identifica a la Alternativa 3 – *Remoción basada en el riesgo y desecho fuera del sitio* como la acción seleccionada. La Alternativa 3 consta de los siguientes componentes:

- Aseguramiento de los permisos y acuerdos de acceso necesarios para la remoción del suelo y el remedio;
- Excavación de suelos que contienen concentraciones elevadas de plomo en propiedades que están dentro del PIA que cumplen con los criterios incluidos en este Plan de Limpieza;
- Las excavaciones contra casas, cocheras, edificios exteriores, entradas de auto, aceras, muros perimetrales estructurales, bardas y patios serán escalonadas según sea necesario para evitar debilitar las estructuras;
- Las actividades de remoción no ocurrirán bajo cubiertas duras, plataformas o áreas no fácilmente accesibles para los residentes;
- Si una maceta no es estructuralmente sólida, será removida con la concurrencia del dueño de la propiedad;
- Los arbustos pequeños y otras plantas de menos de cuatro (4) pies de altura (excluyendo árboles y arbustos establecidos) serán retirados y de desecharán fuera del sitio con la concurrencia del dueño de la propiedad;
- Las áreas alrededor de árboles y arbustos establecidos se excavarán a aproximadamente seis (6) pulgadas por debajo de la superficie del terreno dentro de la zona de goteo para evitar daños a las raíces;
- Las áreas que estén aproximadamente a seis (6) pulgadas de instalaciones subterráneas de servicios no se alterarán para evitar daños a las instalaciones;
- Se usarán las mejores prácticas de manejo (BMP, por sus siglas en inglés) para evitar la entrada o salida del agua pluvial y minimizar la generación de polvo;
- Se han desarrollado Características de Diseño del Proyecto (PDF, por sus siglas en inglés) para el proyecto y se usarán para evitar o minimizar el impacto a la comunidad y al ambiente (Apéndice L);
- El suelo será apilado sobre hojas de plástico adyacentes a las áreas de excavación y transferido rápidamente a un camión de arrastre. Las pilas de suelo se mantendrán en áreas que minimicen el acceso a los residentes y las inconveniencias para ellos. Si las pilas de suelo impactado por plomo o las excavaciones de la superficie se dejan durante la noche, la porción expuesta será cubierta con plástico para reducir las emisiones de polvo. El plástico estará etiquetado con el contenido de la pila y se colocarán señales que indiquen el contenido junto a la pila, dando hacia la calle para los transeúntes;
- El suelo impactado por plomo se desechará en una instalación de desecho (es decir, relleno) con los permisos apropiados;
- Se realizará el muestreo de confirmación, el muestreo de caracterización de desechos y el monitoreo del aire para verificar la implementación apropiada de las actividades de limpieza;

- EL muestreo de confirmación del relleno será realizado de acuerdo con la guía de relleno importado del DTSC (DTSC, 2008);
- La restauración del sitio dependerá de la cubierta superior que elija el dueño de la propiedad (granito descompuesto, cubierta orgánica, césped o una combinación de ellos) y su disponibilidad relativa;
- El relleno estructural se colocará a profundidades de seis (6) a 18 pulgadas;
- Las seis (6) pulgadas superiores de la superficie del terreno incluirán relleno de suelo superficial cubierto con cubierta orgánica, granito descompuesto, césped o una combinación de ellos; y
- Ofrecer a los residentes la opción de reubicarse mientras el suelo contaminado con plomo se excava y retira de sus propiedades y la opción de que se realice una limpieza interior con vacío de aire particulado de alta eficiencia (HEPA, por sus siglas en inglés) una vez que se hayan completado las actividades de campo.

Después de la terminación de las actividades de limpieza para cada propiedad, el contratista de limpieza preparará y enviará un Carta de Terminación (LOC, por sus siglas en inglés), para revisión y aprobación del DTSC. Una vez que el DTSC apruebe la LOC, esta será proporcionada al dueño y el inquilino de la propiedad, si se solicita, para documentar las actividades de limpieza que se completaron en la propiedad. La LOC proporcionará un panorama general del proyecto y puede incluir lo siguiente:

- Actividades previas a la excavación: copias del (los) acuerdo(s) de acceso firmado(s); evaluación de visita inicial; identificación y documentación de la presencia de ductos de aire; documentación de solicitudes de limpieza interior; resultado de Pro UCL 5.1 (o versión posterior) para la propiedad; Mitigación de CDPH de Notificación de Evaluación de Riesgos de Plomo Formulario 8551 e Informe de Evaluación de Riesgos de Plomo Formulario 8552 o versiones posteriores, y permisos aplicables y autorizaciones de servicios.
- Documentación del trabajo de campo: copias de los informes de laboratorio que presentan los resultados de mediciones de campo XRF y análisis de laboratorio fijo de muestras de suelo; figuras que ilustran las áreas de trabajo y ubicaciones de muestras; cronología fotográfica del trabajo de campo, y confirmación de los resultados del muestreo.
- Postlimpieza y restauración: Formularios de Reconocimiento de Compensación; resultados de compactación de relleno, y Evaluación Postlimpieza de Plomo.

Las LOC serán firmadas y selladas por un Higienista Industrial Certificado en Plomo y un Ingeniero Civil con licencia de California.

Un programa para la implementación de la alternativa de limpieza preferida se presenta en la Sección 8 de este Plan de Limpieza.

Un periodo de comentarios públicos formales[13] sobre el Borrador del Plan de Limpieza, originalmente

[13] El alcance público para el Plan de Limpieza se describe con detalle en el Informe Final de Impacto Final, Sección 2.2 *Respuestas Maestras a los Comentarios* (Respuesta Maestra 6). (Apéndice L)

programado para ir del 15 de diciembre de 2016 al 31 de enero de 2017 se amplió en respuesta a solicitudes de los interesados. El periodo de comentarios públicos fue del 15 de diciembre de 2016 al 15 de febrero de 2017. El aviso del periodo de comentarios públicos y las reuniones públicas sobre el Borrador del Plan de Limpieza se publicó en el periódico Eastside Sun el 15 de diciembre de 2016. Un Aviso Público se envió por correo a la lista de correspondencia de Exide y se envió electrónicamente a quienes estaban incluidos en la Listserv de Exide el 14 de diciembre de 2016, que proporcionó información sobre cómo acceder al Borrador del Plan de Limpieza así como enlaces a documentos técnicos clave e información sobre las tres reuniones públicas por celebrarse en el Área de Los Ángeles.

Un segundo aviso se envió el 8 de enero de 2017 para recordar al público sobre las tres (3) reuniones públicas y las ubicaciones. Se establecieron un portal basado en la red y una cuenta de correo electrónico para que quienes hicieran comentarios proporcionaran comentarios en línea. También se recibieron comentarios escritos y verbales en las reuniones públicas celebradas en las siguientes fechas y ubicaciones:

Miércoles, 11 de enero de 2017	Jueves 19 de Enero de 2017	Sábado 28 de enero de 2017
Our Lady of Victory Church 1316 S Herbert Avenue Los Angeles, CA 90023	Maywood City Council Chambers 4319 East Slauson Avenue Maywood, CA 90270	Boyle Heights Resurrection Church 3324 Opal Street Los Angeles, CA 90023

1.0 INTRODUCTION

DTSC has prepared this Cleanup Plan for the cleanup of lead-impacted soil at residential properties, schools, parks, day care centers, and child care facilities within a 1.7 mile radius of the former Exide Facility, which is known as the Preliminary Investigation Area (PIA). This Cleanup Plan also includes an initial screening of other technologies such as *Soil Washing, Stabilization*, and *Phytoremediation* and has been prepared in compliance with the following:[14]

- Stipulation and Order, Docket No. HWCA P3-12/13-010, OAH No. 2013050540;
- Stipulation and Order, Docket No. HWCA 2014-6489, as amended;
- Corrective Action Consent Order, Docket No. P3-01/02-010;
- Imminent and Substantial Endangerment Determination (ISE), Docket No. HSA-FY 15/16-054;
- California Carpenter-Presley-Tanner Hazardous Substances Account Act (HSAA), Health and Safety Code section 25300 et seq.;
- Superfund Lead-Contaminated Residential Sites Handbook (USEPA, 2003);
- The National Contingency Plan (NCP), 40 CFR Part 300;
- Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA, 1988); and
- DTSC Proven Technologies and Remedies Guidance for Metals Remediation in Soil (*PT&R Guidance; DTSC, 2008*). [15]

1.1 SCOPE AND PURPOSE

This Cleanup Plan describes the cleanup of sensitive land use properties, such as residential properties, schools, parks, day care centers, and child care facilities within the PIA-a 1.7 mile radius surrounding the former Exide Facility, [16] with the highest levels of lead in soil and the greatest potential exposure to

[14] These documents can be viewed and downloaded from DTSC's website at https://www.envirostor.dtsc.ca.gov/public/

[15] DTSC conducted a statewide study that reviewed and screened data from 188 corrective action properties where the primary contaminants were metals. Based on this study, DTSC prepared a guidance document—*Proven Technologies and Remedies Guidance for Metals Remediation in Soil (PT&R Guidance; DTSC 2008)*—to streamline the cleanup process for properties that are suitable for PT&R alternatives. This Cleanup Plan has been prepared in accordance with this *PT&R Guidance.*

[16] The closure and cleanup of the former Exide Facility and adjacent industrial areas, including those classified as M-2 heavy industrial/warehousing zones is being addressed under separate processes. The industrial areas located near the former Exide facility are undergoing a separate investigation as part of ongoing corrective action activities and pursuant to the Hazardous Waste Control Law (HWCL) and its implementing regulations.

sensitive individuals[17]. In August 2015, DTSC conducted a preliminary analysis of soil data that indicates that releases from the former Exide Facility may have impacted soil as far as 1.3 to 1.7 miles from the facility. The PIA was identified with a 1.7-mile radius to encompass the largest area potentially affected, based on this available information. The PIA includes approximately 10,000 sensitive land use properties (see Figure 1).

The purpose of this Cleanup Plan is to summarize the environmental conditions within the PIA and explain how the technical data were used to select a preferred cleanup alternative in a manner consistent with the NCP and DTSC's *Proven Technologies and Remedies Guidance – Remediation of Metals in Soil (PT&R Guidance).* This Cleanup Plan describes the cleanup process and includes a conceptual design. The scope of this Cleanup Plan includes the following: the nature and concentrations of lead contamination; evaluation of innovative technologies and proven alternatives; and the cleanup alternative for implementation at the sensitive land use properties within the PIA to address lead contamination in soil.

1.2 APPROACH

This Cleanup Plan defines the approach to the investigation of contamination, develops cleanup objectives, and sets forth the cleanup action to meet the cleanup objectives. The Cleanup Plan is part of a phased approach that allows sensitive land use properties – residential properties, schools, parks, day care centers and child care facilities – within the PIA with common characteristics to be cleaned up.

The investigation of all properties within the PIA has not been completed, and the exact volumes of soils to be remediated at each property are not presented herein. Consequently, the Cleanup Plan presents the approach to investigation, the prioritization process for properties requiring cleanup, and the description of the selected remedy for those properties to be cleaned up.

This Cleanup Plan presents a focused evaluation of cleanup alternatives in accordance with the NCP and *Interim Final, Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* developed by USEPA (USEPA, 1988). Based on the current assessment of lead in soil, the primary contaminant present in shallow soil within the PIA, the technology screening and alternative evaluation portion of the feasibility study was facilitated by using the DTSC's *PT&R Guidance*. Further discussion of this process is presented in Section 4.0.

This Cleanup Plan describes the preferred cleanup technology and includes a conceptual design for cleanup of sensitive land use properties within the PIA. The focus of this cleanup effort is to clean up

[17] Pursuant to this Cleanup Plan, DTSC is performing a removal action to address the most urgent public health threats and impacts posed by lead contamination within the PIA. Accordingly, requirements for remedial action plans outlined in Health and Safety Code section 25356.1, such as the inclusion of nonbinding allocations of responsibility, are inapplicable.

shallow surface (i.e., 18 inches or less) soil impacted with lead within the PIA. This Cleanup Plan also presents a summary of the environmental investigation and cleanup of the PIA properties completed to date.

1.3 SITE DESCRIPTION

The former Exide Facility is located at 2700 South Indiana Street in the City of Vernon, California. The location of the facility is shown in Figure 1 below. The properties to be evaluated and cleaned up under this Cleanup Plan are those properties located within the PIA, defined by an approximately 1.7-mile radius surrounding the former Exide Facility, adjusted outward to major roadways to prevent arbitrarily splitting existing neighborhoods. The PIA is generally bounded by State Highway 60 to the north, South Soto Street to the west, Gage Avenue to the south, and Eastern Avenue as well as other secondary surface streets to the east. The areas immediately adjacent to the former Exide Facility are zoned commercial and industrial, and are outside of the scope of this Cleanup Plan.

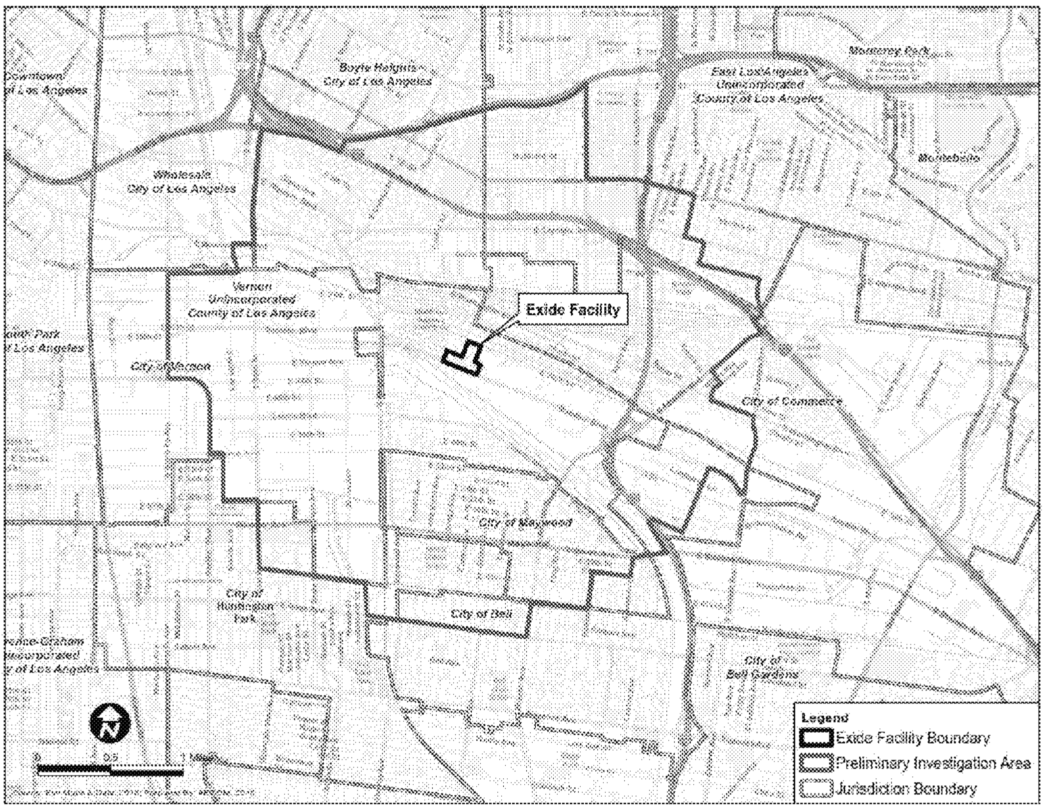

Figure 1 – Site Location and Surrounding Neighborhoods

The sensitive land use properties included in the PIA include residential properties, schools, parks, day care centers, and child care facilities. The PIA is divided along the predominant wind directions centered on the former Exide Facility (see Figure 2).

1.4 SITE HISTORY AND BACKGROUND

A lead recycling facility operated at the Exide Facility property from 1922 until March 2014. Exide acquired the facility and property in 2000. Past activities conducted at the former Exide Facility that may have contributed to lead contamination of soil at offsite properties within the PIA include:

- Battery breaking;
- Smelting;
- Lead refining;
- Storage, handling, and transportation of batteries, finished lead product, and other materials associated with recycling operations;
- Uncontrolled chemical processing;
- Inadequate maintenance and repair of the containment building;
- Air releases from stacks;
- Releases from spills at the site and from trucks transporting to and from the site;
- Releases from storm water containment and other liquid containments; and
- Inadequate dust controls, contributing to dispersion of lead-impacted airborne particulate releases.

1.4.1 REGULATORY HISTORY

The former Exide Facility was used for a variety of metal fabrication and metal recovery operations since the 1920s. Lead-acid batteries were also crushed and recycled in a secondary lead smelter system. Prior to Exide, previous owners included Morris P. Kirk & Sons, NL Industries, Gould Inc., and GNB Inc.

The facility was operated by Exide's predecessor, Gould Inc., beginning in the early—1980s. Gould Inc. filed a RCRA Part A notification on November 19, 1980, as a treatment and storage facility. The Part A notification identified storage of spent lead-acid batteries and other lead-bearing material prior to treatment and recycling, and a wastewater treatment system. The State of California Department of Health Services (DHS), DTSC's predecessor, issued Gould Inc. an *Interim Status Document* on December 18, 1981. An *Interim Status Document* functions as a temporary permit and imposes operating requirements while the final permit is under review and development.

GNB Inc. purchased the former Exide Facility and filed a revised Part A application on July 5, 1985. On September 3, 1986, DHS determined that a permit was required. GNB Inc. submitted the first RCRA Part B application on November 8, 1988. On December 13, 1999, DTSC approved a *Class 2 Interim Status Modification* for Supplemental Environmental Projects (SEPs) as part of an enforcement case settlement. On June 30, 2000, DTSC approved a *Class 2 Interim Status Modification* to replace the Waste Water Treatment Plant and to provide secondary containment. On January 5, 2001, DTSC approved a *Class 1 Interim Status Modification*, for change of ownership and operational control to Exide Corporation. On November 16, 2001, DTSC approved a *Class 1 Interim Status Modification*, for a name change from Exide Corporation to Exide Technologies, Inc.

A 2002 *Corrective Action Consent Order* (Docket No. P 3-01-02-010) entered into between DTSC and Exide requires that Exide perform certain corrective action measures to address releases of hazardous waste or hazardous waste constituents at the former Exide Facility.

In January 2013, Exide submitted a revised Risk Assessment to SCAQMD indicating a significant health risk associated with toxic air releases from the former Exide Facility. This triggered SCAQMD's public notification requirements and required Exide to implement risk reduction measures in accordance with SCAQMD Rule 1402.

Due to concerns about lead contamination, in April 2013, DTSC ordered Exide to temporarily suspend facility operations. Exide filed an ex parte application for a temporary restraining order and order to show cause for a preliminary injunction. The Los Angeles Superior Court granted Exide's request for a temporary restraining order and preliminary injunction, which stayed DTSC's order to temporarily suspend facility operations until the administrative enforcement proceeding could be completed. In October 2013, DTSC and Exide then entered into a *Stipulation and Order* (Docket No. HWCA P3-12/13-010) to settle the allegations alleged in DTSC's order to temporarily suspend operations at the facility.

The *Stipulation and Order* also required Exide to implement SCAQMD's requirements and to perform residential soil sampling focused on those areas with the highest predicted maximum exposed individual resident (MEIR) for lead and arsenic north and south of the former Exide Facility, as represented in Exide's January 2013 *Revised AB2588 Health Risk Assessment*. The sampling areas are shown in Figure 2 (on page 2-3) as the Initial Assessment Areas. In addition, the *Stipulation and Order* required Exide to determine background levels of lead and other metals in soil and to delineate the extent of lead contamination in residential soil above background or DTSC's screening level for lead in residential soils of 80 ppm.

In March 2014, Exide shut down its operations because it could not meet new rules enacted by SCAQMD, and has not operated since that date. In November 2014, DTSC and Exide entered into a *Stipulation and Order* (Docket HWCA No. 2014-6489; *2014 Stipulation and Order*), which included requirements related to facility closure and required Exide to clean up contaminated residential properties in the Initial Assessment Areas.

In January 2015, DTSC determined that the liner system under the containment building where Exide stored crushed battery feed material had failed. On January 30, 2015, DTSC ordered Exide to investigate the extent of contamination under the containment building so that Exide could implement any necessary corrective actions.

In February 2015, DTSC initiated the process of denying Exide's permit application. After a detailed review of Exide's record and its Part B hazardous waste permit application, DTSC notified Exide that the facility could not operate in compliance with California's safeguards to protect public health and the environment. In March 2015, DTSC notified Exide that DTSC intended to deny Exide's Part B hazardous waste permit application and ordered Exide to withdraw its permit application, permanently cease operations, and close the facility in accordance with a DTSC-approved closure plan.[18]

On November 12, 2015, DTSC issued an *Imminent and Substantial Endangerment Determination* for the PIA based on the elevated lead concentrations in surface soils. DTSC determined that a response action is necessary within the PIA because there has been a release of a hazardous substance (i.e., inorganic lead).

On December 8, 2016, DTSC approved the Exide Final Closure Plan (DTSC, 2016b). Exide has begun formal closure of the Exide Facility, subject to DTSC oversight and in accordance with the HWCL and its implementing regulations. Closure of the former Exide Facility is a separate regulatory process and is outside of the scope of this Cleanup Plan.

1.5 REGIONAL GEOLOGY AND HYDROGEOLOGY

This section provides a brief overview of the regional geology and hydrogeology in the vicinity of the PIA. Given that the properties that may be subject to cleanup action are located in developed areas, much of the existing surface soil may be fill material from unknown sources.

1.5.1 GEOLOGY

The PIA is located within the Coastal Plain of the Los Angeles Basin in the Peninsular Range Geomorphic Province, between the northern Peninsular and Transverse Ranges. The Transverse Ranges trend east-to-west, while the Peninsular Ranges extend southeastward into Baja California, Mexico. These ranges are composed of mildly metamorphosed sedimentary and volcanic rocks of Jurassic age. The Los Angeles Basin is also part of the onshore portion of the California continental borderland, characterized by northwest-trending offshore ridges and basins, formed primarily during early-and-middle Miocene time. Major northwest trending strike-slip faults, such as the Whittier, Newport–Inglewood, and Palos Verdes faults, dominate the basin (Bilodeau, 2007).

Regional geologic maps identify soils underlying the PIA as composed of Quaternary alluvium, including young-alluvial sand or silt (Jennings, 1969). The Lakewood Formation directly underlies the soils, which in turn is underlain by the San Pedro Formation, followed by the Pico Formation. National Resources Conservation Service soil data for the study area indicate the alluvium that underlies the PIA is the Hanford Fine Sandy Loam unit (Hf) (LA County, 2004). Loam soils consist primarily of sand and silt with lesser amounts of clay and humus.

[18] Stipulation and Order Amending 2014 Vernon Stipulation and Order, Docket No. 2014-6489.

The former Exide Facility is located in the City of Vernon, but the PIA includes portions of the Cities of Los Angeles (Boyle Heights), Huntington Park, Commerce, Bell, and Maywood and the unincorporated County of Los Angeles (East Los Angeles neighborhoods).

Native soils encountered in the City of Vernon area include the following (LA County, 2004):

- Chino Silt Loam (Cs) – Dark brownish gray to nearly black, silt loam. Texture and color is variable. Subsoil member consists of brown or grayish-brown strata of silt, clay, and fine sand found below a depth of 12 to 18 inches. Lighter textured parts are brown.
- Hanford Fine Sandy Loam (Hf) – Brown to grayish-brown, relatively light-textured, fine sandy loam, open and friable. Subsoil member encountered at a depth of 12 to 15 inches. Texture varies near streams. Subsoil can continue uniform to a depth of 6 feet.
- Ramona Loam (Ro) – To a depth of 12 to 24 inches, the soil is brown, grayish-brown or dark-brown light-textured loam. Subsoil member is reddish-brown, brown or red, compact clay loam or clay. Semi-cemented in places.
- Tujunga Fine Sandy Loam (Tf) – Gray, brownish-gray, or very light grayish-brown fine sandy loam that extends to a depth of 1 to 6 feet. Strips of sand/fine sand/gravelly sand can occur irregularly over the surface.
- Yolo Loam (Y) – Brown or grayish-brown with some small to medium gravel and generally uniform to 6 feet in depth. Subsoil member is lighter in color than the surface soil, ranging from light-brown, yellowish brown, or slightly reddish brown.

1.5.2 HYDROGEOLOGY

Depth to groundwater at the former Exide Facility has been measured at approximately 76 to 87 feet below ground surface (bgs). Groundwater beneath the former Exide Facility is likely perched, as evidenced by deeper groundwater elevations recorded in an offsite monitoring well (MW-17) along the south side of Bandini Boulevard (E2 Environmental, 2015). Overall water levels in monitoring wells set in the former Exide Facility perched zone have been decreasing, and some wells that previously contained water have gone dry.

The former drought and paving of previously unpaved areas in the vicinity are likely the significant reasons for the water level decline (AGC, 2015).

Use of groundwater for water supply in the vicinity of the former Exide Facility is currently limited to groundwater extracted from the deeper water bearing zones or regional aquifer (approximately 500 to 1,000 feet bgs). The City of Vernon operates five drinking water supply wells within a one (1)-mile radius of the former Exide Facility. The closest of those wells is Vernon Production Well #17, situated 0.44 miles west- southwest of the facility. Deep-water wells are unlikely to be affected by lead contamination in surface soils because lead is not generally mobile in soils. The drinking water wells in the City of Vernon are tested regularly in accordance with state requirements and do not show elevated lead levels. Information about drinking water in the City of Vernon can be found at http://www.cityofvernon.org/images/VernonWater2015.pdf (last accessed November 2016).

Public supply wells in the PIA and surrounding area are deep wells, screened beneath 500 feet bgs. The degree of communication or interconnection between the shallow water-bearing or perched zone and the deep-water- bearing or regional aquifer has not been established (AGC, 2004). Nevertheless, based on the nature of lead contamination in soil in general, and soil data collected within the PIA to date, it is unlikely that perched groundwater would be impacted by the lead in surface soils significantly outside of the former Exide Facility boundaries. Thus, this Cleanup Plan will not address groundwater conditions. Groundwater impacts are being addressed under the *Onsite Corrective Measures Study* being developed for the former Exide Facility.

2.0 SITE CHARACTERIZATION AND NATURE AND EXTENT OF CONTAMINATION

Inorganic lead has been found in soils within the PIA that range from 2 ppm to 45,600 ppm. DTSC's screening level for lead in residential soils is 80 ppm. The nature and extent of lead contamination of the properties within the PIA are attributed to the former Exide Facility's lead-acid battery recycling operations. Other potential lead sources that have may have affected the soils in the PIA include residue of leaded fuel combustion (e.g., from gasoline combustion prior to phase out of leaded gasoline), lead-based paint that was historically used to paint many of the residences, nearby buildings, and structures; and historical industrial operations at other area facilities.

The *Stipulation and Order* (Docket HWCA P3-12/13-010) required Exide to prepare and implement a sampling plan for the properties located in the Initial Assessment Areas, which is discussed further in Section 2.1.1 below. DTSC also required that Exide include a study to establish background levels in the soil. In 2014, Exide conducted a preliminary background soil study approximately 14 miles to the south of the former Exide Facility in the City of Long Beach, California. Exide's sampling and analysis of this "Background Area" showed that the representative soil lead concentration is 76.6 ppm.

In March 2014, DTSC required Exide to conduct additional sampling and take interim measures to mitigate threats to public health within the Initial Assessment Areas, which is further discussed in Section 2.1.1 below. This additional sampling was required to determine whether offsite soils contained concentrations of lead that were greater than background or DTSC's screening level for lead in residential soils of 80 ppm.

Under the *2014 Stipulation and Order*, DTSC required Exide to undertake, among other actions, the sampling and cleanup of 215 (later confirmed to be 219) properties in the Initial Assessment Areas, which is further discussed in Section 2.1.1below.

DTSC conducted a further analysis of lead and other metals data from the soil sampling conducted. DTSC established the PIA around the former Exide Facility (see Figure 3), based on several analyses including a preliminary statistical evaluation of data generated from soil sampling at depth intervals between 0 inches and 6 inches collected up to 4.5 miles from the former Exide Facility. The data, statistical analyses, and information DTSC has available to date, including the first round of soil samples collected by Exide beginning in 2013, indicate that lead releases from the former Exide Facility may have contaminated soil up to a distance of 1.3 to 1.7 miles surrounding the former Exide Facility, depending on direction. The PIA was identified with an approximate 1.7-mile radius to encompass the largest area potentially affected, based on this available information. DTSC will continue to take the significant steps necessary to protect the people living in the communities around the former Exide Facility, and will use the data collected for cleanup in the PIA, as well as other information and analyses, to confirm or reevaluate its estimate of the geographical area potentially contaminated by releases from the former Exide Facility.

Although DTSC cannot speculate at this time about what the results of these evaluations will show, if the future data support it, DTSC may propose further cleanup actions in areas outside of the PIA.

The PIA includes portions of the Cities of Los Angeles (Boyle Heights), Huntington Park, Commerce, Bell, and Maywood and the unincorporated County of Los Angeles (East Los Angeles neighborhoods). The PIA is depicted in Figure 3.

Initial estimates based on Los Angeles County records indicated that approximately 10,000 parcels,[19] designated for residential, schools, parks, and day care centers, and child care facilities, exist within the PIA. Subsequent site visits and site research indicate that more residential properties may exist within the PIA than were initially estimated. The increase in the number of potential residential properties is a result of parcel splitting and changes in land use. A single parcel may have more than one residential unit or property and a property may occupy more than one parcel. Field observations indicate that more than one residential unit is often seen on some parcels. The uncertainty in the number of parcels or properties requiring sampling and cleanup led DTSC to select an approach that will allow DTSC to sample and clean up any properties used as residences, schools, parks, day care centers, and child care facilities within the PIA that require cleanup without the need to prepare individual cleanup plans for each property.

DTSC is conducting sampling to evaluate lead concentrations in surface soil at approximately 10,000 properties designated for residences, schools, parks, day care centers, and child care facilities. To assess lead impacts within the PIA, DTSC has used either x-ray fluorescent (XRF) meters to measure lead concentrations in soil at each property on a real-time basis (with laboratory confirmation of selected samples) or submitted soil soils directly to a laboratory for lead analysis. Sampling efforts will be largely completed in the summer of 2017. Work plans describing this sampling are presented in Appendices A, B, C, and D.

2.1 PREVIOUS INVESTIGATIONS

This section summarizes the assessments of the residential properties, schools, parks, day care centers, and child care facilities in the PIA, which support the implementation of this Cleanup Plan. It also includes the background area assessment, the nature of the contaminant distribution based on existing data, and the conceptual site model for potential exposures to lead in soil.

[19] For the purposes of this document, “property” and “parcel” are used interchangeably. DTSC recognizes that there may be a single land use on multiple properties or parcels, and there may be multiple residential units on a single property or parcel. DTSC will continue to refer to and track its cleanup efforts by parcel for consistency and because the idea of “parcel” is uniform and clearly definable under the law.

2.1.1 ASSESSMENT OF RESIDENTIAL PROPERTIES

Assessment of residential properties has occurred in phases beginning with an initial assessment that occurred in 2013. DTSC directed Exide to conduct Phase 1 soil sampling in two residential areas, known as the Northern and Southern Initial Assessment areas, that were identified as having the greatest potential for elevated lead impacts approximately one (1) mile to the north and south of the former Exide Facility and located in Boyle Heights/East Los Angeles and Maywood, respectively (see Figure 2). These two areas are collectively referred to as Initial Assessment Areas. The boundaries of the two areas were selected based on air modeling performed by ENVIRON, Exide's contractor, which estimated the location of the MEIR.

Based on the results of the initial sampling, DTSC issued a *Stipulation and Order* (Docket No. HWCA: P3-12/13-010) in October 2013 that required Exide to prepare an additional sampling work plan and a corrective action plan for properties in the Initial Assessment Areas. An *Offsite Soil Sampling Work Plan* and *Interim Remedial Measures Work Plan (IRMW)* were submitted by Exide to address the sampling and remediation of properties in the Initial Assessment Areas (AGC, 2013, 2014b, 2014c).

In November 2013, DTSC approved the *Work Plan* (AGC, 2013) for shallow soil sampling at 39 randomly selected residential properties that included 19 properties in the Northern Initial Assessment Area and 20 properties in the Southern Initial Assessment Area (see Figure 2). The yellow circles to the north and south of the former Exide Facility correspond to the Initial Assessment Areas. The sampling required that five locations at each of the 39 properties be sampled and analyzed by the laboratory for arsenic, lead, antimony, cadmium, and total chromium.

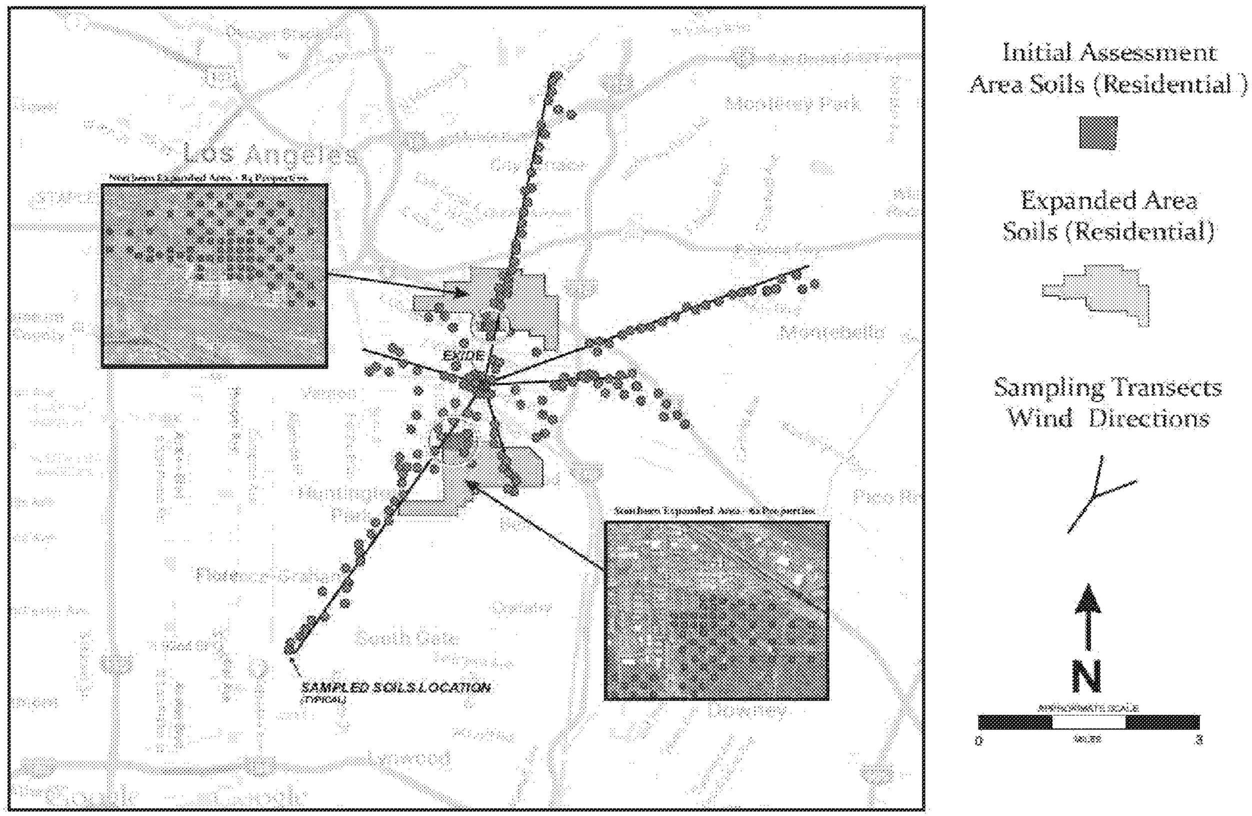

Figure 2 – Exide Initial Sampling Locations and Predominant Wind Directions

As a pilot study, initial cleanup was focused on two residential properties located in the Initial Assessment Areas with soil lead concentrations greater than the current USEPA regional screening level for residential exposure of 400 ppm. A summary of the remediation of the two properties was provided in the *Post-Remediation Report* (AGC, 2014d).

Between August 2014 and November 2015, Exide's contractors, performed additional shallow soil sampling in the remainder of the Initial Assessment Areas (AGC, 2014, 2016; Environ 2014, 2015). Exide obtained access agreements to sample 195 of the 219 properties located within the Initial Assessment Areas. Exide completed soil cleanups at 186 properties within the Initial Assessment Areas. Several properties within the Initial Assessment Area did not require cleanup, the owners refused to allow access to sample and clean up the properties, or the owners did not respond to requests for sampling. The soil removal actions were conducted using funds Exide deposited into a trust administered by DTSC.

Soil lead concentrations exceeding DTSC's screening level for lead in residential soils of 80 ppm were identified in nearly all residential properties in the Initial Assessment Areas. As a result of the findings in the Initial Assessment Areas, a "Phase 2" Expanded Area characterization effort was launched in 2014. DTSC approved an addendum to Exide's initial November 2013 *Soil Sampling Plan* (AGC, 2014b), and soil sampling was expanded beyond the Initial Assessment Areas because the limits of residential soils with elevated concentrations of lead had not been adequately defined. Samples were taken from an additional 146 residential properties on a grid pattern extending outward from the Initial Assessment Areas with a total of 84 additional properties sampled in the north and 62 additional properties sampled in the south. The expanded areas of investigation represented approximately 1.1 square miles to the north of the former Exide Facility (i.e., the Northern Expanded Area) and 0.8 square miles to the south (i.e., the Southern Expanded Area). Figure 2 shows the relationship of the original Initial Assessment Areas to the Expanded Areas and Figure 3 below shows the relationship of the Expanded Areas to the PIA. In addition, public and private K-12 schools and play areas within public parks were sampled as part of the Expanded Area sampling. Many of the properties sampled during Phase 2 sampling exceeded the DTSC screening level for lead in residential soils of 80 ppm, which prompted DTSC to perform additional assessment and cleanup of residential properties within the PIA. This work was done in accordance with a plan for sampling 1,500 sensitive use properties and a cleanup plan for 50 residential properties (Parsons 2015a, 2015b) attached as Appendix A and Appendix C.

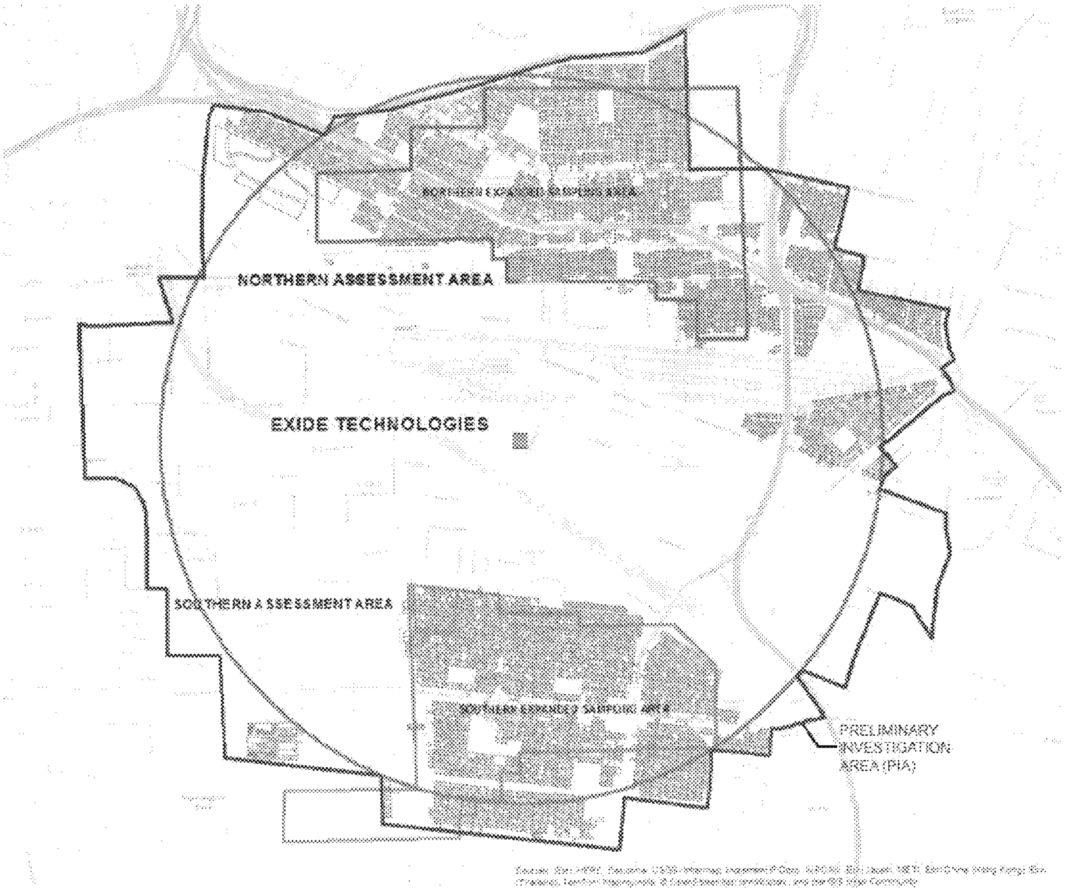

Figure 3 – PIA and Northern and Southern Expanded Sampling Areas

2.1.2 Assessment of Schools

There are twenty-four (24) public schools and five (5) private schools within the PIA[20]. A list of the public and private schools and summary of their cleanup status is included in Tables 1 and 2, respectively.

[20] Of the 24 public schools, 23 were sampled in accordance with the sampling plans included in Appendices B and D. Aspire Antonio Maria Lugo Academy is a new school for which a Preliminary Endangerment Assessment was completed and submitted to DTSC, which indicated soil lead concentrations below the DTSC screening level for lead in residential soils of 80 ppm. DTSC approved the Preliminary Endangerment Assessment for Aspire Antonio Maria Lugo Academy on October 7, 2014.

Exide began sampling public schools in the vicinity of the former Exide Facility in November 2013 (AGC, 2014a)[21]. The initial school sampling was conducted at San Antonio Elementary School[22] and at Volunteers of America Salazar Park School (Salazar Park School)[23], which are approximately 9,500 feet to the southeast of the former Exide Facility and 6,400 feet to the north of the former Exide Facility, respectively. The results of Exide's sampling, as well as additional sampling conducted by the Los Angeles County Public Health Department (LACPD), did not find levels of lead at the schools that would be considered a threat to human health and the environment.

In July 2015, DTSC received authorization from Los Angeles Unified School District (LAUSD) to continue sampling public schools within the PIA and directed Exide to test for lead in soil at 11 LAUSD schools. Analysis of composite samples from these campuses showed that seven (7) campuses did not have levels of lead that would be considered a threat to human health and the environment. Four (4) campuses had soil lead concentrations less than DTSC's screening level for lead in residential soils of 80 ppm and four (4) campuses had lead concentrations greater than DTSC's residential screening level of lead in residential soils of 80 ppm and required additional sampling by DTSC: Eastman Avenue Elementary School, Lorena Elementary, Rowan Elementary School and Fishburn Avenue Elementary School. Three (3) of these schools required cleanup. LAUSD cleaned up three (3) public schools: Eastman Avenue Elementary School in September 2015; Rowan Elementary School in September 2016; and Lorena Elementary in November 2016[24]. The results of additional sampling at Fishburn Avenue Elementary School did not find levels of lead that would be considered a threat to human health and the environment.

[21] As part of Exide's off-site soil sampling program, soil samples were collected at five (5) sampling locations at each school and park. Composite soil samples were created for each of the following depth intervals (0 to 1 inches,1 to 3 inches, 3 to 6 inches, 6 to 12 inches, and 12 to 18 inches) and analyzed for lead by a fixed laboratory using Method 6010B.

[22] This school was later determined not to be within the PIA boundaries and is not counted as one of the 24 public schools located within the PIA.

[23] Salazar Park School is a Head Start preschool and child care facility located in the City of Los Angeles. Salazar Park School is identified as not requiring cleanup ion Table 4 - Summary of Cleanup Status of Day Care Centers and Child Care Facilities within the PIA.

[24] The residential screening level for lead in residential soils was derived using DTSC's Lead Risk Assessment Spreadsheet, referred to as "LeadSpread 8," which at 80 ppm predicts an increase in blood lead of 1 (one) microgram per deciliter (ug/dL) at the 90th percentile for a population of children exposed to lead in soils at their home, and a subsequent decrease of one (1) Intelligence Quotient (IQ) point in these children. The model assumes a child resides at the home seven (7) days per week. The model for parks is also based on exposure seven (7) days per week. The model for schools is based on exposure five (5) days per week; accordingly, the screening level for lead in soils at schools is 110 ppm. These three (3) public schools were cleaned up by LAUSD based on this screening level.

In addition to the eleven (11) LAUSD public schools sampled by Exide, DTSC analyzed for lead in soil at eleven (11) additional LAUSD schools in the PIA. None of these schools required additional sampling or cleanup. As of January 2017, LAUSD and DTSC have completed assessment and related clean-up efforts at all 24 public school campuses within the PIA. DTSC provided clearance letters to LAUSD for its twenty (22) public school campuses.[25] A summary of the public schools and status is included in Table 1.

[25] Clearance letters were provided to LAUSD based on DTSC's screening level for lead in schools of 110 ppm.

Table 1 – Summary of Cleanup Status of Public Schools within the PIA

APN	Facility Name	Facility Address	District	Status
6318028900	Aspire Antonio Maria Lugo Academy (brand new school)	6100 Carmelita Avenue Huntington Park, California 90255	Charter	NFA[26]
5239010905	Amanecer Primary Center	832 South Eastman Avenue Los Angeles, California 90023	LAUSD	NFA
5170019901	Carmen Lomas Garza Primary Center	2750 Hostetter Street Los Angeles, California 90023	LAUSD	NFA
6318032901	Chester Nimitz Middle School	6021 Carmelita Avenue Huntington Park, California 90255	LAUSD	NFA
5190026903	Christopher Dena Elementary	1314 Dacotah Street Los Angeles, California 90023	LAUSD	NFA
5190026903	Dacotah Early Education Center	3142 Lydia Drive Los Angeles, California 90023	LAUSD	NFA
5242016901	Eastman Avenue Early Education Center	1266 Gage Avenue Los Angeles, California 90023	LAUSD	NFA
5242015903	Eastman Avenue Elementary School	4112 E. Olympic Boulevard Los Angeles, California 90023	LAUSD	NFA
6312019901	Fishburn Avenue Elementary School (CS-Ingenium Clemente)	5701 Fishburn Avenue Maywood, California 90270	LAUSD	NFA
5246004906	Ford Blvd. Elementary School	1112 South Ford Boulevard Los Angeles, California 90023	LAUSD	NFA
6314025901	Heliotrope Elementary School (CS - Clemente)	5911 Woodlawn Avenue Maywood, California 90270	LAUSD	NFA
6318030912	Huntington Park Elementary	6055 Corona Avenue Huntington Park, California 90255	LAUSD	NFA
6310019904	Huntington Park Senior High	6020 Miles Avenue Huntington Park, California 90255	LAUSD	NFA
6311010902	Loma Vista Elementary School	3629 E. 58th Street Maywood, California 90270	LAUSD	NFA
5188021900	Lorena Street Elementary (CS - Extera PS No. 2)	1015 South Lorena Street Los Angeles, California 90023	LAUSD	NFA
6317014906	Maywood Academy High School	6125 Pine Avenue Maywood, California 90270	LAUSD	NFA
6313002910	Maywood Elementary School	5200 Cudahy Avenue Maywood, California 90270	LAUSD	NFA

[26] Aspire Antonio Maria Lugo Academy is a new school for which a Preliminary Endangerment Assessment was completed and submitted to DTSC, which indicated soil lead concentrations below the DTSC screening level for lead in residential soils of 80 ppm. DTSC approved the Preliminary Endangerment Assessment for Aspire Antonio Maria Lugo Academy on October 7, 2014.

APN	Facility Name	Facility Address	District	Status
6317020913	Nueva Vista Elementary School	4412 Randolph Street Bell, California 90201	LAUSD	NFA
5190001904	Oscar De La Hoya Animo Charter High	1114 South Lorena Street Los Angeles, California 90023	LAUSD	NFA
6332002966	Richard N. Slauson, SE Occupational Center	5500 Rickenbacker Road Bell, California 90201	LAUSD	NFA
5188007900	Robert Louis Stevenson Middle	725 South Indiana Street Los Angeles, California 90023	LAUSD	NFA
5238009900	Rowan Avenue Elementary	600 South Rowan Avenue Los Angeles, California 90023	LAUSD	NFA
6310018900	San Antonio Continuation	2861 Randolph Street Huntington Park, California 90255	LAUSD	NFA
5244025900	Bandini Elementary School	2318 Couts Avenue Los Angeles, California 90040	Montebello	NFA

Notes

APN - Assessor's Parcel Number
NFA - No Further Action

Sampling at the five (5) private schools within the PIA was completed in December 2016 in accordance with the Supplemental Sampling Plan for Schools and Parks in Appendix D. Of the five (5) private schools sampled, four (4) of the schools require cleanup and one (1) of the schools requires a localized removal at a planter.[27] A list of the schools and status is summarized in Table 2.

Table 2 – Summary of Cleanup Status of Private Schools within the PIA

APN	Facility Name	Facility Address	Facility Type	Status
5188008039	Cristo Viene Christian School	3607 Whittier Boulevard Los Angeles, California 90023	Private	Localized cleanup
6311006030	Maywood Christian School	3759 East 57th Street Maywood, California 90270	Private	Localized cleanup
5242019031	Our Lady of Victory School	1317 South Herbert Avenue Los Angeles, California 90023	Private	Localized cleanup
5190013032	Resurrection Catholic School	3324 Opal Street Los Angeles, California 90023	Private	NFA
6317002030	St Rose of Lima School	4430 East 60th Street Maywood, California 90270	Private	Localized cleanup

Notes

APN – Assessor's Parcel Number
NFA – No Further Action

[27] These five (5) private schools will be cleaned up based on DTSC's screening level for lead in schools of 110 ppm.

2.1.3 ASSESSMENT OF PARKS

There are sixteen (16) parks and publicly-used open spaces[28] within the PIA. Investigations of these parks occurred in stages beginning with soil sampling of the first four (4) parks conducted by Exide and the remaining twelve (12) parks completed by DTSC.

Exide collected soil samples at four (4) parks within the PIA — Pine Avenue Park, Pixley Park, Freedom Park, and Parque De Los Suenos. The soil sampling consisted of five (5) sampling locations at each park, targeting play areas with grass or bare soil. Composite soil sampling was performed for each of the five (5) sampling locations at five (5) soil depth intervals (i.e., 0–1, 1–3, 3–6, 6–12, and 12–18 inches bgs). For Pine Avenue Park, soil lead concentrations ranged from 5.46 ppm to 45.1 ppm. Lead results of soil samples collected for Pixley Park ranged from 38.3 ppm to 67.5 ppm. For Parque De Los Suenos, soil lead concentrations ranged from 25.3 ppm to 46.5 ppm. Given the concentrations detected at these parks they required no further action. Soil lead concentrations for Freedom Park ranged from 7.9 to 2,750 ppm. The 2,750 ppm concentration was found in the six (6)- to 12-inch composite sample. Follow-up discrete analysis of the samples collected at this depth showed concentrations of only 9.28 ppm to 36.5 ppm. Based on this, DTSC, with concurrence from the Los Angeles County Parks Department and LACDPH, concluded that the 2,750 ppm lab result was likely an anomaly or laboratory error, and determined that no further action was necessary.

In spring 2016, DTSC conducted soil sampling at two (2) parks for the City of Commerce—Bandini Park and Bristow Park. For these parks, soil samples were collected from five (5) locations at four (4) depth intervals (i.e., 0-3, 3-6, 6-12, and 12-18 inches bgs) from each location and taken to the laboratory for analysis. In addition, five (5) discrete samples taken of the zero (0) to three (3)-inch interval were analyzed using the XRF method for both parks.

Results of the XRF measurements of surface soils at Bristow Park ranged from 61 ppm to 96 ppm for lead in soil, while the laboratory results of the composite samples ranged from 32 ppm to 70 ppm for lead in soil. Because of this discrepancy, DTSC conducted additional laboratory analysis of the discrete samples and collected soil samples from three (3) additional locations. The final sampling results indicated that only three (3) locations at Bristow Park had elevated lead levels above 80 ppm. Further analysis of the samples demonstrated that the representative soil lead concentration at Bristow Park was 64.4 ppm, which is below the DTSC screening level for lead in residential soils of 80 ppm. Based on the representative soil lead concentration and the existing turf cover in Bristow Park, DTSC concluded that the few elevated lead detections did not pose a health risk to park visitors.

Results for XRF measurements of surface soils at Bandini Park ranged from 37 ppm to 143 ppm for lead in soil, while the laboratory results of the composite samples ranged from 58 ppm to 83 ppm for lead in

[28] Open spaces in front of government buildings with park-like settings where people congregate for recreation.

soil. Again, DTSC conducted additional laboratory analysis of the discrete samples and collected soil samples from three (3) additional locations. The final sampling results indicated that four (4) locations at Bandini Park had samples with lead levels above 80 ppm. Further analysis of the samples demonstrated that the representative soil lead concentration at Bandini Park was 69.1 ppm, which is below the DTSC screening level for lead in residential soils of 80 ppm. Based on the representative soil lead concentration and the existing turf cover in Bandini Park, DTSC concluded that the few elevated lead detections mentioned above did not pose a health risk to park visitors.

Composite sampling of five (5) locations at Treder Park showed concentrations of lead between 36.4 ppm and 43 ppm for the upper four (4) sample depths (i.e., 0-1, 1-3, 3-6, and 6-12 inches bgs). The composite sample collected at the 12 -to 18-inch depth had a concentration of lead in soil at 143 ppm, which is above the DTSC screening level for lead in residential soils of 80 ppm. As a resulted, DTSC analyzed discrete samples collected in the 12 -to 18-inch depth. Two (2) of the five (5) discrete samples were below 80 ppm; the remaining three (3) samples were found to have lead concentrations at 159 ppm, 219 ppm, and 319 ppm. While these concentrations are elevated, it is highly unlikely that a child would come into contact with soils in these area at these depths constantly for an extended period of time. Nevertheless, DTSC has determined that further assessment of Treder Park is appropriate.

In November and December 2016, DTSC sampled the remaining ten (10) parks and publicly-used open spaces; seven (7) of which were found to have concentrations of lead below DTSC's screening level for lead in residential soils of 80 ppm in the upper 12 inches of soil. The remaining three (3) parks and publicly-used open spaces all required additional assessment or cleanup. These included the Bell City Hall and Bell Library all in the City of Bell; and Benito Juarez Park in the City of Maywood.

Table 3 – Summary of Cleanup Status of Parks within the PIA

APN	Facility Name	Facility Address	Status
6317021900	Area in front of Bell Library	4411 Gage Avenue Bell, California 90201	Cleanup required
6317021907	Area in front of City Hall	6330 Pine Avenue Bell, California 90201	Cleanup required
6317021907	Area in front of Police Department	6326 Pine Avenue Bell, California 90201	NFA
5244008900	Bandini Park	4725 Astor Ave Commerce, California 90040	NFA
6317023904	Bell City Skate Park	4357 Gage Avenue Bell, California 90201	NFA
6311026902	Benito Juarez Park	5515 Maywood Avenue Maywood, California 90270	Cleanup required
5244005903	Bristow Park	1466 S McDonnell Avenue Commerce, California 90040	NFA
6318031905	Freedom Park	6074 Carmelita Avenue Huntington Park, California 90255	NFA

APN	Facility Name	Facility Address	Status
5190026904	Lou Costello Junior Youth Center	3141 East Olympic Avenue Los Angeles, California 90023	NFA
6314023910	Maywood Park	4801 East 58th Street Maywood, California 90270	NFA
5241020901	Parque de los Suenos	1318 South Bonnie Place Los Angeles, California 90023	NFA
6313024900	Pine Avenue Park	5313 Pine Avenue Maywood, California 90270	NFA
6311011901	Pixley Park	3626 East 56th Street Maywood, California 90270	NFA
5188024900	Ramon Garcia Recreation Center	1016 South Fresno Street Los Angeles, California 90023	NFA
6314030906	Riverfront Park	5000 Slauson Avenue Maywood, California 90270	NFA
6317020904	Treder Park	6250 Pine Avenue Bell, California 90201	Further assessment

Notes

APN – Assessor's Parcel Number
NFA – No Further Action

2.1.4 ASSESSMENT OF DAY CARE CENTERS AND CHILD CARE FACILITIES

Based on Department of Social Services, Child Care Licensing Program records, and field investigations, 52 day care centers[29] and child care facilities[30] have been identified within the PIA. Table 4 provides a summary of day care centers and child care facilities. The day care centers and child care facilities are listed in alphabetical order by the city. Sampling of day care centers and child care facilities has occurred in stages beginning with the work done by Exide, followed by Parsons, Arcadis, and EFI Global under DTSC oversight. Forty-six (46) of the properties sampled exceed the residential screening level of 80 ppm.

Table 4 – Summary of Cleanup Status of Day Care Centers and Child Care Facilities within the PIA

	APN	Facility Name	Facility Address	City	Status
1	6318023029	Ceron Family Child Care	6332 Carmelita Avenue	Bell	Cleanup required
2	6317033019	Cruz-Liera Family Child Care	6320 Corona Avenue	Bell	Cleanup required
3	6318024003	Monteon Family Child Care	3916 Randolph Street	Bell	Cleanup required

[29] A residential family day care center that provides care to no more than 12 children.
[30] A commercial child care facility that provides care to more than 12 children in a school like setting.

	APN	Facility Name	Facility Address	City	Status
4	6317033023	Unlicensed	6300 Corona Avenue	Bell	Cleanup required
5	5246014023	Centro Aztlan Day Care	1120 McDonnell Avenue	Commerce	Cleanup required
6	5244003031	Josefina Ayala Trust (also known as Ayala Family Child Care)	1432 McBride Avenue	Commerce	Cleanup required
7	5244029010	Urias Family Child Care	4903 Nobel Street	Commerce	Cleanup required
8	6318029027	Barragan Family Child Care	3927 Randolph Street	Huntington Park	Cleanup required
9	6317005001	Castillo Family Child Care	4207 East 61st Street	Huntington Park	Cleanup required
10	6318027026	Fuentes Family Child Care	3742 East 61st Street	Huntington Park	NFA
11	6317012008	Torres Family Child Care	6173 Fishburn Avenue	Huntington Park	Cleanup required
12	6319021006	YMCALA – Preschool	3355 Gage Avenue	Huntington Park	Cleanup required
13	5238002014	Agredano Family Child Care	3636 East 5th Street	Los Angeles	Cleanup required
14	5188009009	Amaro Family Child Care	3707 Siskiyou Street	Los Angeles	Cleanup required
15	5242006002	Arellano, Emilia Family Day Care	1144 South Hicks Avenue	Los Angeles	Cleanup required
16	5242014027	Arreola Sierra Family Child Care	1251 Eastman Avenue	Los Angeles	Cleanup required
17	5238008022	Casillas Family Child Care	3850 East 5th Street	Los Angeles	Cleanup required
18	5190015008	Cortez Family Child Care	3416 Garnet Street	Los Angeles	NFA
19	5236003018	Downey Road Head Start	475 Downey Road	Los Angeles	Cleanup required
20	5170003021	Espinoza Family Child Care	1156 South Orme Avenue	Los Angeles	Cleanup required
21	5190021900	Estrada Child Development Head Start	1320 South Concord Street	Los Angeles	Cleanup required
22	5190024900	Estrada Learning Center	3225 Hunter Street	Los Angeles	NFA
23	5170004027	Figueroa Family Child Care	1128 South Mott Street	Los Angeles	Cleanup required
24	5188024900	Garcia Park Head Start	1016 South Fresno Street	Los Angeles	Cleanup required
25	5188008009	Hernandez-Cortez Family Child Care	3642 Percy Street	Los Angeles	Cleanup required
26	5239006034	Las Flores Preschool	1075 South Eastman Avenue	Los Angeles	Cleanup required
27	5170003023	Lizarraga Family Child Care	1148 Orme Avenue	Los Angeles	Cleanup required
28	5236010025	Maof Child Care Center Telegraph (also known as Maof Telegraph)	4457 Telegraph Road	Los Angeles	Cleanup required
29	5238003003	Nevarez & Banuelos Family Child Care	463 South Rowan Avenue	Los Angeles	Cleanup required
30	5238016040	Ortiz Family Child Care	3961 Princeton Avenue	Los Angeles	Cleanup required
31	5238013038	Plaza Child Observation & Development Center	648 South Indiana Street	Los Angeles	Cleanup required
32	5238008025	Salazar Family Child Care	3870 East 5th Street	Los Angeles	Cleanup required

	APN	Facility Name	Facility Address	City	Status
33	5239003902	Salazar Park Head Start School/Day Care	3864 Whittier Boulevard	Los Angeles	NFA
34	5170004013	Toxqui Family Child Care	1165 South Orme Avenue	Los Angeles	Cleanup required
35	5241008020	Union Pacific Cdc/Ywca Of Greater L.A.	4315 Union Pacific Avenue	Los Angeles	NFA
36	5242019028	Union Pacific Cdc/Ywca Of Greater L.A.	4198 Union Pacific Avenue	Los Angeles	Cleanup required
37	5244024013	Volunteers of America, Commerce Head Start	5102 Kinsie Street	Los Angeles	Cleanup required
38	6311004006	Acosta Family Child Care	3716 East 54th Street	Maywood	Cleanup required
39	6314023910	Baldwin Park USD Tri-cities Head Start Maywood Center	4801 East 58th Street	Maywood	Cleanup required
40	6314026008	Bravo Family Child Care	4828 East 59th Street	Maywood	Cleanup required
41	6312022030	Coalicion De Latino Americanos, Inc.	3801 East Slauson	Maywood	NFA
42	6314026010	Cortez Family Child Care	4820 East 59th Street	Maywood	Cleanup required
43	6313028021	Diaz, Petra Family Day Care	4339 East 58th Street	Maywood	Cleanup required
44	6312012017	Ixcoy	4213 East 55th Street	Maywood	Cleanup required
45	6312028002	Los Angeles Speech & Language Therapy Center	4020 Slauson Avenue	Maywood	Cleanup required
46	6314023910	Maywood Child Development Center	4801 58th Street	Maywood	Cleanup required
47	6311006030	Maywood Early Education Campus	3759 East 57th Street	Maywood	Cleanup required
48	6316008010	Pineda Family Child Care	6144 Woodward	Maywood	Cleanup required
49	6311002017	Ruiz Family Child Care	3579 East 53rd Street	Maywood	Cleanup required
50	6311007033	Tejena Family Child Care	3700 57th Street	Maywood	Cleanup required
51	6314014022	Tri-City Headstart	4743 Slauson Avenue	Maywood	Cleanup required
52	6313016008	Viramontes & Santa Cruz Family Child Care	4418 East 57th Street	Maywood	Cleanup required

Notes
APN - Assessor's Parcel Number
NFA No Furhter Action

2.2 NATURE AND EXTENT OF CONTAMINATION

This section presents the vertical and lateral distribution of the contaminant of concern (COC); specifically, lead in soil at sensitive land use properties within the PIA and the results of field activities that formed the basis for this determination. The results of investigations conducted to date indicate that soil with lead concentrations exceeding DTSC's screening level for lead in residential soils of 80 ppm is present at properties within the PIA designated for residential use. The representative soil lead concentration is a health protective, statistical assessment of the property-wide lead level based on the analysis of all samples taken from the property.

An evaluation of the soil sample results from 60 properties within the PIA indicated that lead concentrations generally decreased with soil depth. Figure 4 below shows a decrease in the lead concentrations as depth increases from 1 to 18 inches bgs. The greatest concentrations detected were observed between the surface and 6 inches bgs. A vertical profile to illustrate the general occurrence of lead identified within the soil is also presented in Figure 4.

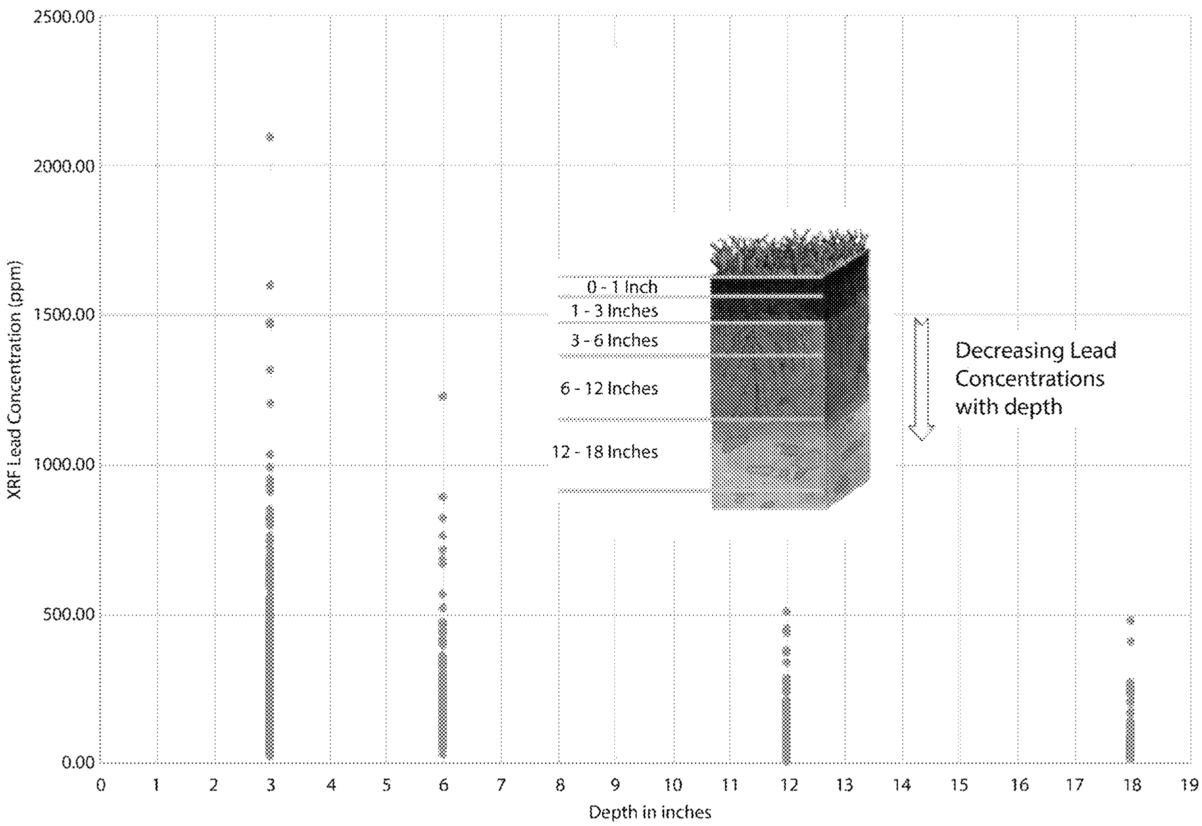

Figure 4 – XRF Results for Lead Vs Depth for 60 Properties

As of April 14, 2017, DTSC had assessed 7,408 properties within the PIA for lead either with field instruments (i.e., XRF meters) or the laboratory analysis of soil samples. Soil samples were collected at approximately 15 locations per property in the zero (0)- to three (3)-inch depth range. When using XRF, the highest two locations were also scanned at six (6), 12, and 18 inch depths to determine lead concentrations in soil at various depths and two soil samples from the sample locations with the highest results were sent for lead analysis at a certified laboratory for quality control. The laboratory sample results are used to verify the field XRF readings of lead in the surface soil. To determine the potential exposure concentrations, the representative soil lead concentration based on XRF readings or laboratory results was calculated for each property. The range of lead concentrations detected in soils at the properties within the PIA are illustrated in Figure 5.

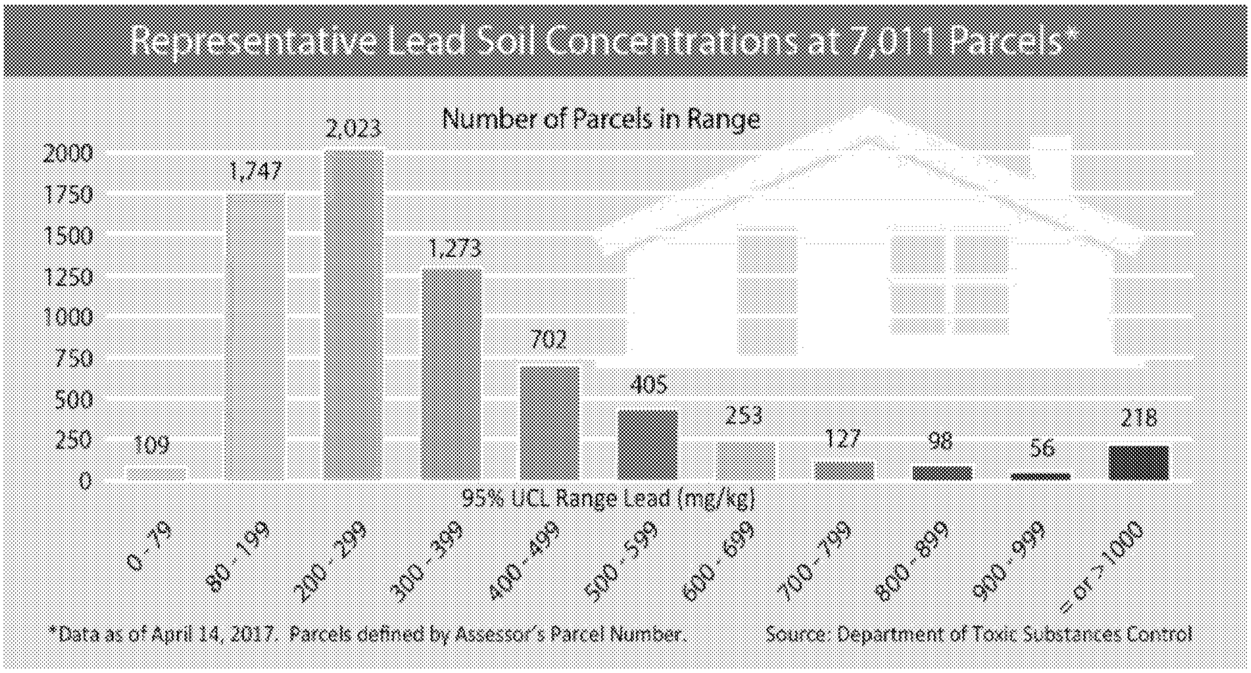

Figure 5 – Representative Parcel-Wide[31] Lead (Pb) Soil Concentrations versus Number of Parcels

Based on the data distribution, it is estimated that more than 98 percent of the properties in the PIA have a representative soil lead concentration that is greater than or equal to DTSC's screening level for lead in residential soils of 80 ppm and approximately 26 percent of the properties have a representative soil lead concentration greater than the USEPA Residential Screening Level for lead of 400 ppm.

2.3 CONCEPTUAL SITE MODEL

A conceptual site model describes the movement of chemicals from their original sources through the environment within a specified area (in this case, the PIA) to potential populations (i.e., the potentially exposed population) that may be exposed to the chemicals. Figures 6 and 7 present a pictorial representation of the conceptual site model for the PIA, which is discussed in greater detail in the paragraphs below. Figure 8 illustrates the human health conceptual site model as a diagram in

[31] The representative property-wide lead concentration is based on the 95 percent upper confidence limit (UCL) statistical analysis, which is greater than the average concentration of lead on the property, but below the maximum concentration. The 95 percent UCL concentration represents the concentration that would be greater than the true mean value of the samples on the property 95 percent of the time. The 95 percent UCL and maximum lead concentrations are used to determine the level of exposure to lead at each property.

accordance with USEPA and DTSC risk assessment guidance (USEPA, 1989; DTSC, 2011). The components of the conceptual site model are listed below.

- Sources of lead;
- Distribution of lead in areas surrounding the facility;
- Affected exposure media (e.g., soil, air, water); and
- Potential populations that may be exposed.

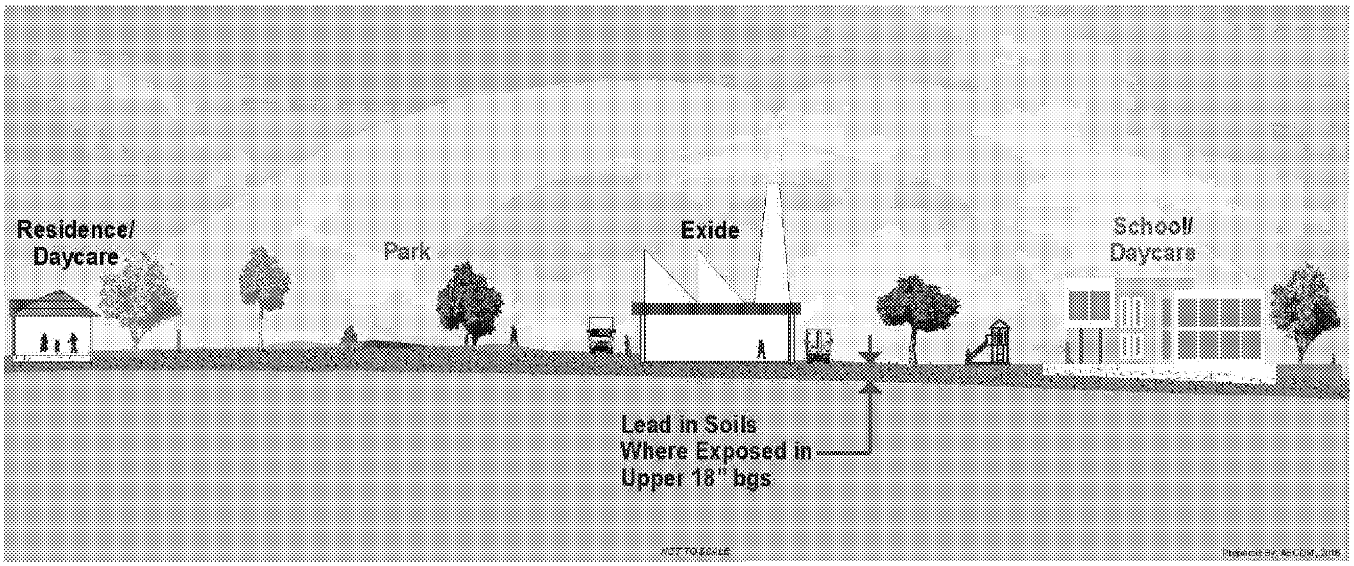

Figure 6 – Pictorial Conceptual Site Model

As described in Section 1.0, lead-acid battery recycling activities associated with past operations at the former Exide Facility between 1922 and 2014, coupled with insufficient air pollution control and inadequate waste management practices, likely resulted in the release of lead that contaminated-properties within the PIA.

Primary sources of lead contamination are believed to be aerial "smokestack" emissions and other fugitive releases from or at the facility, including from trucks transporting materials. Other potential sources of lead that may have affected the soils in the PIA, but are not related to the former Exide

Facility operations, include: (1) leaded fuel combustion (e.g., from gasoline combustion prior to lead phase-out); (2) lead-based paint that was historically used to paint many of the nearby buildings and structures; and (3) historical industrial operations at other area facilities.

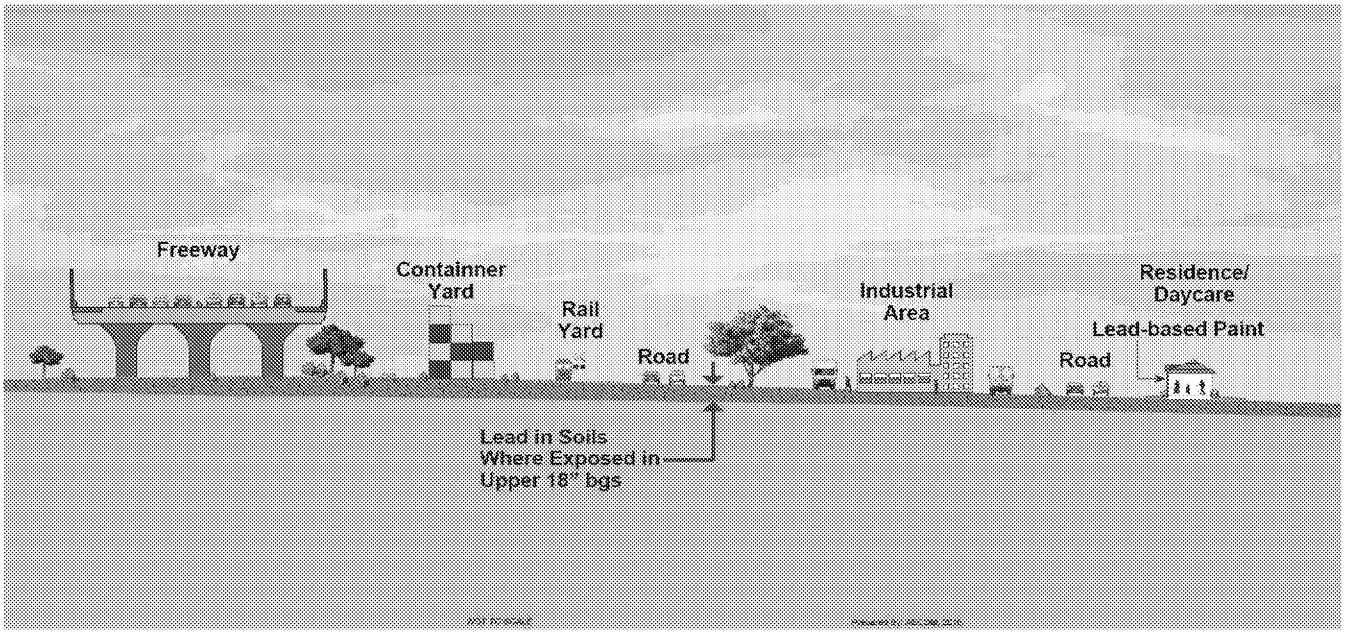

Figure 7 – Pictorial Conceptual Site Model

The pictorial conceptual site model shown in Figures 6 and 7 depict the primary source—releases of lead from the former Exide Facility—as the main source of contamination. Other potential sources are shown in Figure 7; however, it is important to bear in mind the ways in which they may contribute to total exposure, especially because lead-based paint is the overwhelming cause of childhood lead poisoning.

A primary transport mechanism is through aerial releases. Aerial releases of lead generally impact shallow soil and decreases with depth (see Figure 8). Lead particles are transported through the air and deposited on the soil, thus becoming a source of contamination to adults working or children playing on the bare soil.

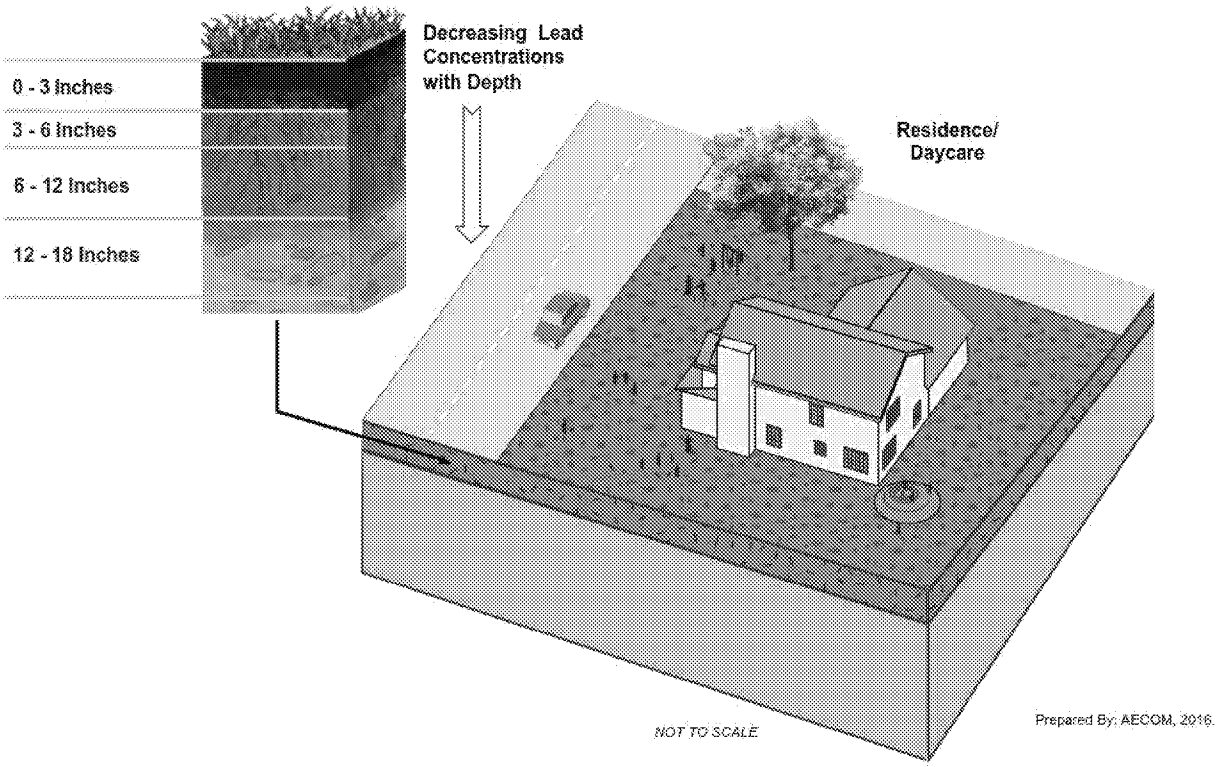

Figure 8 – Pictorial Human Health Conceptual Site Model

A conceptual site model is one of the primary planning tools used to support the decision-making process for managing impacted properties such as lead-contaminated properties within the PIA. The conceptual site model assists with organizing available information such as contaminant sources, release mechanisms, exposure medium/routes, and demographics in a clear and transparent structure so that identification of data gaps can be accomplished. In the graphical conceptual site model, shown in Figure 8 below, the relevant exposure media includes surface soils and air-borne particulates within the defined areas, which are released through soil disturbance activities or dispersion. The routes of human exposure include incidental ingestion, dermal contact, and particulate inhalation. The key populations are sensitive individuals such as young children and pregnant women.

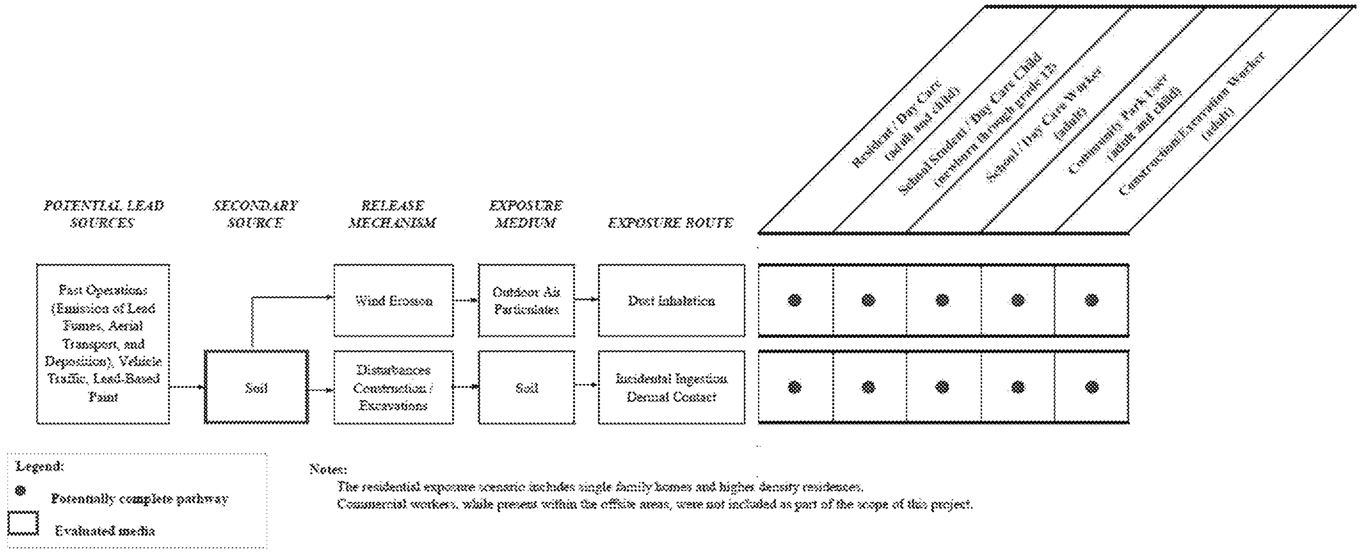

Figure 9 – Graphical Conceptual Site Model

The most likely populations for exposure to lead in soil at properties within the PIA are residents, which includes sensitive individuals such as young children and pregnant women. This exposure scenario assumption requires the most protective cleanup requirements based on reasonably-anticipated, future land use scenarios. This Cleanup Plan applies that protective scenario to residences, schools, parks, and day care centers and child care facilities.

Figure 10 summarizes the dominant exposure pathway for residents in the PIA. A primary source of contamination is releases of lead from the former Exide Facility, which resulted in contamination of properties within the PIA. The soil then became a secondary source of exposure. The release mechanism is through soil disturbance, whereby the soil becomes the exposure medium with ingestion being the most significant exposure route. Currently, populations could be exposed to lead via ingestion, inhalation, and dermal or direct contact. The hazard posed by the soil is based on the concentrations in the soil, the toxicity of lead, and the accessibility of lead in the soil. To decrease or eliminate the hazard, the exposure pathway needs to be broken, by either covering or removing the soil.

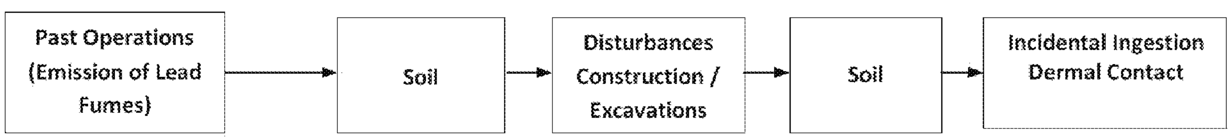

Figure 10 – Primary Exposure Pathways for Residential Properties in the PIA

Dust containing lead that settled onto impervious surfaces within the PIA, such as hardscape, plants, rooftops, sidewalks, and roadways is likely transported by wind or rain to settlement areas including yards, planters, and catch basins. These areas become secondary sources of lead contamination. Minimal amounts of lead contamination are expected to be present on impervious surfaces because these surfaces are rinsed by rain on a regular basis. Therefore, based on the source and transport pathways described above, the most likely ongoing source of potential lead exposure involving lead from past operations at the former Exide Facility is surface soil in yards and planters, as well as soil and dust on or immediately around plants.

2.4 HUMAN HEALTH RISK EVALUATION FRAMEWORK

Given that soil sampling is ongoing, the Human Health Risk Evaluation Framework has been established in accordance with DTSC-Human and Ecological Risk Office's (HERO), *Human Health Risk Assessment Note 3* (HERO Note 3). There are screening levels for evaluating the potential risk from lead concentrations in soil. The potential human health risk at each property is determined by comparing the concentrations of a representative number of soil samples against the screening level. In addition, the Exposure Point Concentration–the concentration that would most likely be encountered on the surface of the property is taken into account. The Exposure Point Concentration is determined by calculating the representative soil lead concentration from the concentrations detected at each property. Because the representative soil lead concentration is used to calculate the Exposure Point Concentration these two terms are used interchangeably. The Exposure Point Concentration is compared to the DTSC's screening level for lead in residential soils of 80 ppm to determine the potential risk.

As presented in Section 2.2 above, lead has been detected in soil at multiple sensitive land use properties within the PIA at concentrations greater than DTSC's screening level for lead in residential soils of 80 ppm. Cleanup objectives were developed based on the current understanding of the properties' characterization results and the current and future anticipated uses of the properties within the PIA.

2.4.1 SOIL SCREENING LEVELS

Soil screening levels provide conservative thresholds and are compared to the concentrations in soil to determine if the property is safe or if cleanup is necessary to break the exposure pathway. HERO Note 3 established a risk-based soil lead concentration as an Exposure Point Concentration, discussed in more detail in Section 2.4.2. A representative, property-wide soil lead concentration of 80 ppm is used for properties with sensitive land use also known as unrestricted land use. If a single sample exceeds the soil lead screening level, the exposure area as a whole may not exceed the allowable limits as long as the representative, property-wide concentration is below the 80 ppm.

California Code of Regulations, title 17, section 35036 defines lead contaminated soil as "... bare soil that contains an amount of lead equal to, or in excess of, four hundred parts per million (400 ppm) in children's play areas and one thousand parts per million (1,000 ppm) in all other areas." The 400 ppm concentration of lead in children's play areas was based on a composite soil sample collected in children's play areas with bare soil and a child's blood lead level of concern of 5 micrograms per deciliter (µg/dL). DTSC's screening level for lead in residential soils of 80 ppm is below the level established in California Code of Regulations, title 17 and is based on a revised toxicity evaluation for lead as summarized below.

In 2007, California Environmental Protection Agency (Cal/EPA) Office of Health Hazard Assessment (OEHHA) developed a new toxicity evaluation for lead, replacing the 5 µg/dL threshold blood lead concentration that was used as a basis for the 400 ppm concentration with a source-specific "benchmark change" of 1 µg/dL. One (1) µg/dL is the estimated incremental increase in children's blood lead levels that would reduce Intelligence Quotient (IQ) by up to one point. In light of the updated lead toxicity criterion, as well as the need for revision to ensure that the model is adequately protective of sensitive individuals, such as children and pregnant women, DTSC developed a new version of the DTSC Lead Risk Assessment Spreadsheet, referred to as "LeadSpread 8."

The soil screening levels were calculated using worksheet 1 of LeadSpread 8. These soil screening levels represent concentrations in soil that would result in an estimated 1 µg/dl increase in blood lead in a child. In consideration of the health effects posed by high blood lead levels in children less than seven (7) years of age and pregnant women, DTSC consequently adopted a screening level for lead in residential soils of 80 ppm.

2.4.2 Exposure Point Concentration

The Exposure Point Concentration[32] also known as Exposure Concentration[33] is the lead concentration considered representative of a Decision Unit. A Decision Unit refers to the individual property or portion of a property that can be separately characterized for lead impacts such as the front yard, back yard, side yard (if present), or drip zone, as shown in Figure 11, from the USEPA's *Superfund Lead-Contaminated Residential Site Handbook* (USEPA, 2003). DTSC will use discrete samples from each Decision Unit or the entire property to determine the Exposure Point Concentration, which is more conservative than the collection of composite samples as recommended in USEPA's *Superfund Handbook*.

[32] Hero, Note 3, June 2016
[33] 40 CFR Part 300

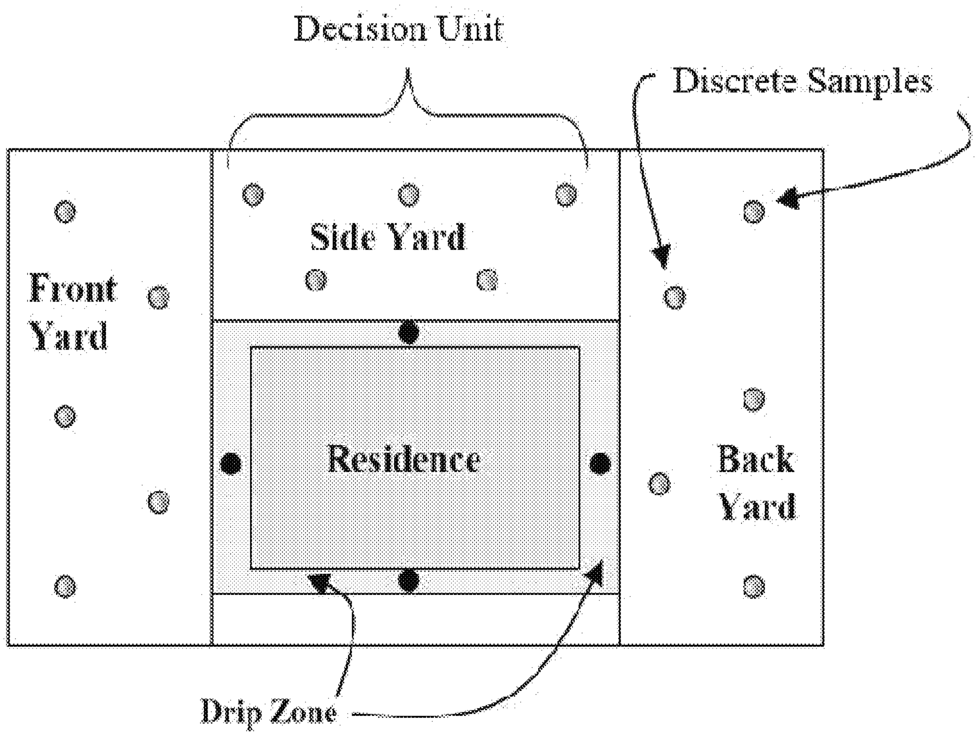

Figure 11– Relationship of Decision Unit to Exposure Area

The assessment of lead risk and the need for cleanup are evaluated in two ways. First, the discrete samples from each property are used to calculate the representative soil lead concentration for the lead using USEPA's statistical software package UCL Pro 5.1. The representative soil lead concentration is used as the Exposure Point Concentration to determine the potential risk to sensitive individuals for the entire property.

Second, the maximum observed lead concentration may be used to assess the cleanup requirements for a specific Decision Unit. If samples exceed the Soil Screening Level within a Decision Unit, the Decision Unit would be evaluated to determine if there are geographically collocated areas of elevated lead concentrations that would require cleanup. That is, the representative soil lead concentration or the maximum concentration found at a property will be used to establish the Exposure Point Concentration.

2.4.3 LEAD BACKGROUND STUDY

The *2014 Stipulation and Order* defines the background for lead as less than 80 ppm. This level is based on a background lead study conducted by Exide to ensure that the selected soil screening level is not less than background levels in the area (AGC, 2014a). For the background study, Exide selected a "background area" located about 14 miles to the south of the Exide Facility in the City of Long Beach to provide a basis for comparing soil data from the Initial Assessment Areas. The selected area was residential and considered similar to the PIA, but without potential lead contamination from the former Exide Facility, because of its proximity to major freeways, a historically industrial area, a sizable rail yard with intermodal facility and switching yard, and housing of similar size and density. Nineteen (19) residential properties were sampled as part of the background study. The results of the background study were included in the *Offsite Soil Sampling Report* (AGC, 2014a). The lead concentration in surface soil (0 -3 inches) ranged from 29 to 195 ppm with a median value of 54.8 ppm. Based on the soil sampling results, the median lead concentration in shallow soil in the background area was significantly lower than the lead concentrations in the Initial Assessment Areas. The representative, property-wide soil lead concentration was 76.6 ppm in the Background Area, which is below the DTSC screening level for lead in residential soils. Because the representative soil lead concentration of the background lead concentrations is less than the selected screening level for lead in residential soils of 80 ppm used to evaluate risk, the Exposure Point Concentrations exceeding the selected screening level are considered unlikely to be attributable to background.

3.0 CLEANUP OBJECTIVES AND THE TARGET CLEANUP GOAL

Site characterization conducted under the *Sampling and Analysis Plans* (Appendix A and Appendix C) to date has documented the presence of lead in soil at properties throughout the PIA. A human health risk-based evaluation has determined the need for cleanup action (see Section 2.0, above). As a result, cleanup objectives have been developed based on the current understanding of the environmental conditions and the current and reasonably anticipated future uses of properties within the PIA. Based on the objectives, a target cleanup goal was developed that established a specific concentration of lead in soil that is protective of human health. A discussion of human health risks, cleanup objectives, the target cleanup goal, and regulatory requirements is presented below.

3.1 CLEANUP OBJECTIVES

Cleanup objectives define the extent to which properties require cleanup to protect human health and the environment. Cleanup objectives reflect the contaminants of concern, exposure routes, populations, and acceptable or range of acceptable concentrations for each media of concern. As discussed in Section 2.0 above, site characterization conducted to date has documented the presence of lead in soil at properties throughout much of the PIA. The most likely populations for exposure to lead in soil at properties within the PIA are the residents, including sensitive individuals such as children under 7 years of age and pregnant women. The current and future exposure routes to lead include ingestion, inhalation, and dermal contact. According to DTSC's risk evaluation, ingestion by children accounts for 99 percent of the risk posed by the lead-impacted soil in the PIA.

The following cleanup objectives were developed based on the current understanding of the site characterization results for properties within the PIA, the current and reasonably anticipated future uses of properties within the PIA, and the current and future anticipated risk to sensitive individuals at sensitive land use residential properties within the PIA:

- Promptly clean up sensitive land use properties in the PIA in a manner that willachieve a cleanup goal that is protective of public health and the environment.
- Protect the current and future health of the residential population from exposure to lead in soil that presents an unacceptable risk to sensitive individuals through ingestion, inhalation, and dermal contact.
- Restore disturbed soils to a condition compatible with the existing surrounding environment and land use.
- Minimize the volume of contaminated soil to be disposed in alandfill.
- Minimize, to the extent practicable, the need for institutional and engineering controls.
- Minimize short-term adverse impacts to the residential community due to fugitive dust and soil transport.

Based on the cleanup objectives, a target cleanup goal was developed that established a specific concentration of lead in soil that are protective of both human health and the environment. A discussion of human health risks, the target cleanup goal, cleanup priorities, and regulatory requirements is presented below.

3.2 TARGET CLEANUP GOAL

Lead in soil has been identified as the COC to human health and the environment. Therefore, the soil target cleanup goal was selected based on property-specific soil lead concentrations and the review of the following policy and guidance documents and soil background information:

- HERO Note 3, DTSC-modified Screening Levels (DTSC, June 2016);
- USEPA Regional Screening Levels (USEPA, 2016);
- California Code of Regulation, title 17, section 35036; and
- Background soil concentration comparison (AGC, 2014a).

Screening levels from the above sources are presented in Section 2.4.1 above.

The selection of the soil target cleanup goal conservatively assumes that the exposure pathways represent the potential for ingestion, inhalation, and direct contact with soil by sensitive individuals under a residential exposure land use scenario. The most conservative, or health protective, risk-based screening level under a residential land use exposure scenario was selected. This scenario allows for unrestricted land use. As concluded by HERO Note 3, a soil lead concentration of 80 ppm or less in a residential land use will be protective of children and women of childbearing age (DTSC, 2016a). The proposed soil target cleanup goal for lead in soil at residential properties within the PIA has been conservatively established at a representative soil lead concentration of 80 ppm.

Properties with lead concentrations greater than the proposed target cleanup goal will be cleaned up on a priority basis. Even for a single property, the soil lead concentration can vary greatly due to heterogeneity of the soil, wind patterns, imported fill soil, and reworked native or fill soil. Therefore, to minimize statistical variability and evaluate each property in a consistent fashion, DTSC will initially utilize a representative, soil lead concentration to evaluate each property with consideration of cleanup of individual Decision Units based on the individual sample results. As presented in Section 3.3, DTSC proposes to use both discrete soil lead concentrations and the representative soil lead concentrations as starting points for a prioritized approach for selecting properties for cleanup.

3.3 CLEANUP PRIORITIZATION

Under this Cleanup Plan, cleanup of sensitive land use properties will be determined based on the highest concentrations of lead and greatest potential risk to sensitive individuals. The Cleanup Plan maintains a target cleanup goal of properties with lead sampling results that exceed the representative soil lead concentration of 80 ppm. DTSC estimates that with presently available funding, DTSC can clean up approximately 2,500 of these sensitive land use properties within the PIA with the highest levels of lead and greatest potential health risk to sensitive individuals during this phase of the cleanup.

Initial prioritization for this cleanup phase is based on properties sampled within the PIA prior to June 30, 2017. For each property sampled, the results were statistically analyzed to determine a representative, property-wide lead level that is more health protective than a simple average of results. Using these sampling and analysis criteria for the initial prioritization, the Cleanup Plan provides for the following categories of properties within the PIA to be addressed during this phase of the cleanup:

- Residential properties with a representative soil lead concentration of 400 ppm or higher;
- Residential properties with a representative soil lead concentration of less than 400 ppm, but where any soil sampling result of 1,000 ppm or higher is detected; and
- Day care centers and child care facilities with a representative soil lead concentration of 80 ppm or higher that have not yet been cleaned up.

All parks and schools that require cleanup will be cleaned up during this phase. In addition, this phase of cleanup may also address properties sampled between July 1, 2017, and December 31, 2017, that fall within the above categories.[34]

The Cleanup Plan assumes that sensitive individuals may be present at most properties within the PIA, which is predominantly a residential area. DTSC will identify properties for cleanup based on representative soil lead concentrations. Day care centers, child care facilities, parks, and schools are particularly sensitive land use properties given the large number of sensitive individuals known to use these properties, particularly young children, and the potential for these sensitive individuals to be exposed to lead-contaminated soil while participating in activities at these properties. Accordingly, DTSC will clean up day care centers and child care facilities with a representative soil lead concentration of 80 ppm or higher that have not yet been cleaned up. Additionally, all parks and schools that require cleanup will be cleaned up during this phase. DTSC's sampling data as of June 30, 2017, indicate five (5) private schools, two (2) parks, and 46 day care centers and child care facilities require cleanup or further assessment. Refer to Sections 2.1.2, 2.1.3 and 2.1.4 for further details.

DTSC will also clean up properties sampled prior to June 30, 2017, with a representative soil lead concentration of 400 ppm or higher. DTSC will determine the representative soil lead concentration by using the USEPA's ProUCL software. The representative soil lead concentration calculated by USEPA's ProUCL is a conservative and health protective approach that considers all sampling results, including the highest soil lead concentrations. Although higher than DTSC's target cleanup goal of 80 ppm, the cleanup of properties with a representative soil lead concentration of 400 ppm or higher achieves important health protection goals, consistent with other federal and state programs that protect residents from exposure to lead. DTSC's sampling data as of June 30, 2017, indicate approximately 2,000 properties have representative soil lead concentrations of 400 ppm or higher.

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[34] DTSC may identify additional properties that have representative soil lead concentrations above DTSC's screening level for lead in residential soils of 80 ppm, but fall outside of the above categories, for cleanup if funding permits.

DTSC will also ensure that properties with a representative soil lead concentration of less than 400 ppm, but that also have any soil sampling result of 1,000 ppm or higher that may result in a risk of localized exposure in the top 18 inches of soil, are cleaned up in a manner that is protective of public health. To address the potential risk for exposure, DTSC will consider several factors, including, but not limited to, high levels of lead in soils largely at or near the surface that may migrate and actual or potential exposure to people, especially sensitive individuals and animals from lead. DTSC's sampling data as of June 30, 2017, indicate there are approximately 250 such properties.

Finally, DTSC may clean up additional properties that were sampled between July 1, 2017, and December 31, 2017, and that fall within the categories discussed above.[35]

3.4 POST-CLEANUP EVALUATION FOR LEAD

Following the completion of the cleanup actions, a Post-Cleanup Evaluation will be performed in accordance with the *PT&R Guidance*. This will verify that the target cleanup goal was achieved for the properties that are cleaned up pursuant to this Cleanup Plan. When soil cleanup is completed in accordance with the *PT&R Guidance*, residual levels of lead are evaluated. An example of a post-cleanup evaluation for lead is provided in the *PT&R Guidance* (see Appendix I).

The cleanup contractor will also prepare and submit a Letter of Completion (LOC) for DTSC's review and approval. Once DTSC approves the LOC, it will be provided to the property owner and tenant, if requested, to document the cleanup activities that were completed at the property. The LOC will provide an overview of the cleanup and may include the following:

- Pre-Excavation Activities: copies signed access agreement(s); initial visit evaluation; identification and documentation of the presence of air ducts; documentation of interior cleaning requests; Pro UCL 5.1 (or latest version) output for the property; CDPH Abatement of Lead Hazards Evaluation Notification Form 8551 and Lead Hazard Evaluation Report Form 8552 or later versions; and applicable permits and utility clearances.
- Field Work Documentation: copies laboratory reports presenting results from XRF field measurements and fixed laboratory analyses of soil samples; figures illustrating work areas and sample locations; photographic chronology of field work; and confirmation sampling results.
- Post-Cleanup and Restoration: Compensation Acknowledgement Forms; backfill compaction results; and Post-Cleanup Evaluation for Lead.

LOCs will be signed and stamped by a Lead Certified Industrial Hygienist and California-Licensed Civil Engineer.

[35] DTSC may identify additional properties that have representative soil lead concentrations above DTSC's screening level for lead in residential soils of 80 ppm, but fall outside of the above categories, for cleanup if funding permits.

3.5 SUMMARY OF CLEANUP ACTIONS

Prior to preparation of this Cleanup Plan, 236 properties were cleaned up under separate DTSC authorizations in accordance with the *Final Offsite Interim Remedial Measures Work Plan (IRMW;* Parsons, 2015a). Based on the tons of soil removed to date, on average, 58 tons of soil were removed from each property.

3.6 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Cleanup actions should comply with substantive provisions of federal environmental laws and more stringent, timely-identified state environmental or facility-siting laws. Cleanup actions should comply with applicable or relevant and appropriate requirements (ARARs) to the extent practicable. They may be location, chemical, or action specific standards. "Applicable" requirements are those federal or state laws or regulations that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a specific cleanup site. "Relevant and appropriate" requirements are not directly "applicable" to a specific site, but address similar problems or situations similar enough such that their use is well suited to the site.

A review of pertinent laws, regulations, and other criteria was performed to identify ARARs and other criteria to be considered for remediating soils with elevated concentrations of lead from properties within the PIA. A summary of the potentially relevant ARARs and criteria to be considered is presented in Appendix F. Implementation of the action in the Cleanup Plan will address all ARARs.

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4.0 GENERAL RESPONSE ACTIONS, SCREENING OF CLEANUP TECHNOLOGIES, AND IDENTIFICATION OF CLEANUP ALTERNATIVES

This section summarizes the process DTSC used to initially identify and screen a broad range of actions that may be taken to satisfy Cleanup Action Objectives for this cleanup. General Response Actions, cleanup technologies, and process options applicable to each identified General Response Action were initially evaluated for effectiveness, technical implementability, and relative cost during development of alternatives. Technologies and process options that were not effective in protecting human health and the environment were eliminated during this phase of the screening. EPA guidance (USEPA, 1988) uses "effectiveness" as the most important criteria at this stage. Less weight is given to cost and implementability.

The technologies and process options retained following screening for effectiveness, implementability, and cost were retained for detailed evaluation under an expanded set of evaluation criteria. Consistent with EPA guidance, DTSC also considered sustainable practices (minimizing energy use, water use, and greenhouse gas emissions). Cleanup technologies and representative process options considered the best or most promising on the basis of these additional evaluation factors are described further below and assembled into the cleanup alternatives described in Section 5.0 below.

4.1 GENERAL RESPONSE ACTIONS

General Response Actions are actions that can be taken to address contamination encountered at a site and achieve the cleanup objectives. General Response Actions generally are broad actions that do not take into account all of the site-specific conditions. Once the General Response Actions are considered, cleanup technologies meeting both the response actions and the cleanup objectives are identified. General Response Actions are identified in the CERCLA Remedial Investigation/Feasibility Study guidance (USEPA, 1988). They are media-specific and include: excavation, consolidation, disposal, treatment, containment, institutional actions, and no action. Consistent with this federal guidance, DTSC considered all of the General Response Actions and determined that the *No Action Alternative* does not meet the target cleanup goal for this cleanup. The *No Action Alternative* is included for comparison purposes, as required by the federal guidance.

Table 5 summarizes the General Response Actions, the cleanup technologies and process options available for the primary cleanup objective of preventing direct contact, ingestion, and inhalation of lead-impacted soil.

Table 5 – Primary Cleanup Objective, General Response Actions, Cleanup Technology Types & Process Options Environmental Media – Soil

Primary Cleanup Objective	General Response Action	Cleanup Technology	Process Option
Prevent direct contact, Ingestion and Inhalation of soil with elevated concentrations of lead	No Action*		Administrative Process
	Land Use Covenants (LUCs)/ Institutional	Access and use restrictions	Land use restrictions Deed restrictions
	Containment	Capping	Native soil cover
	Excavation	Selective soil removal	Backhoe, excavator, hand tools, front-end loader
	Disposal	Offsite disposal	Class I,II,III landfill or as landfill cover
	Ex-situ/In-situ treatment	Ex-situ/In-situ biological	Phytoremediation
		Ex-situ physical	Soil washing
		Ex-situ chemical	Stabilization

*Required by the NCP

Available implementation methods were considered in the evaluation of each General Response Action. In this context, the following definitions apply:

- Cleanup technologies are defined as the general categories for remedies under a General Response Action. For example, soil washing is one of the cleanup technologies under the General Response Action of "ex-situ treatment" (i.e., treatment of soil after it has been removed from the ground).
- Process options are specific categories of remedies within each cleanup technology. The process options are used to implement each cleanup technology. For example, the cleanup technology of soil stabilization can be implemented using one of several types of reagents (e.g., Portland cement or a phosphate-based stabilization reagent). Each of these reagents is a separate process option.

The General Response Actions for soil contamination are listed in Table 5 and described below:

- No-Action – No attempt is made to satisfy the cleanup objectives, and no cleanup measures are implemented. A "No Action" alternative is required for consideration by the NCP.
- Institutional Actions – Actions using non-engineering methods by which access to lead-impacted soil is physically restricted or regulated, or contamination is monitored.
- Containment – Actions that result in lead-impacted soil being contained or controlled, thereby minimizing or eliminating the migration of contaminants and preventing direct exposure to contamination.
- In-situ Treatment – Actions taken to treat lead-impacted soil in place to reduce the toxicity, mobility, and volume of contaminants.

- Excavation/Ex-situ Treatment/Reuse – Actions taken to physically remove lead-impacted soil and debris from a property; to treat the soil to reduce the toxicity, mobility, and the volume of contaminants; and to reuse the treated soil as clean backfill.
- Excavation/Offsite Disposal – Actions taken to physically remove lead-impacted soil and debris from a property and dispose of the untreated soil at an appropriate offsite treatment and disposal facility.

4.2 IDENTIFICATION & SCREENING OF CLEANUP TECHNOLOGIES AND PROCESS OPTIONS

Following the development of General Response Actions, potential cleanup technologies and process options are identified. Various technology types and process options are available to implement the General Response Actions. Potentially applicable technology types and process options are identified by drawing on various sources, including references developed specifically for application to lead-impacted soils, internet searches, vendor-supplied information, and soil remediation guidance documents from OEHHA or the USEPA. The purpose of drawing on these sources is to ensure that applicable technologies and process options are not overlooked.

4.2.1 IDENTIFICATION OF CLEANUP TECHNOLOGIES AND PROCESS OPTIONS

Following the technology identification process, three steps are performed in accordance with the NCP:

- Technical implementability screening;
- Evaluation of process options; and
- Selection of representative process options.

These steps are described in the following sections. The significance of innovative technologies and presumptive remedies is also discussed.

4.2.2 TECHNICAL IMPLEMENTABILITY SCREENING

In this step, the comprehensive list of technologies types and process options is reduced by evaluating the technical implementability of the options. Technical implementability refers to the ability of the cleanup technology or process option to meet a cleanup objective. This initial screening eliminates those technologies and process options that are clearly not applicable or not workable for the contaminants or site characteristics found in the PIA.

The technical implementability screening of potential soil remediation technologies and process options is shown on Table 6. This table briefly describes the technologies and process options associated with the General Response Actions and provides screening considerations.

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Table 6 – Description of General Response Actions for Soil Remediation PIA Cleanup Action Plan

SOIL REMEDIATION GENERAL RESPONSE ACTIONS	CLEANUP TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING CONSIDERATIONS
No Action	None	None	No action is taken.	Not applicable. Screened out. Does not satisfy Cleanup objectives or meet the two threshold criteria. Required for consideration by the NCP to provide a baseline for evaluation and comparison. Future residents would continue to be exposed to properties with lead concentrations in soil exceeding the residential cleanup levels.
Institutional Actions	Access and use restrictions	Land use restriction/ Land use covenants (LUCs)	Deed or land use restrictions or LUCs are issued to restrict property use and prohibit unauthorized excavation of lead-impacted soil. Properties with lead concentrations in soil exceeding the residential cleanup levels would require deed restrictions to prevent future residential exposure.	Not applicable. Screened out. Does not satisfy Cleanup objectives. Properties with lead concentrations in soil exceeding the residential cleanup levels would require deed restrictions to prevent future residential exposure.
Containment	Capping	Native soil cap	Lead-impacted soil remains in place and is covered by a cap constructed from clean native soil.	Potentially applicable, however, screened out as a viable response action because of residual contaminated soil left in-place. Reduces contaminant mobility by minimizing infiltration of precipitation and eliminating the direct exposure pathway. Does not reduce the intrinsic toxicity or volume of contaminants. Prevents exposure by enclosing or containing the contaminants. Containment is dependent on the integrity of the cap. Permeability of the cap depends on native soil type. Would leave contamination onsite requiring a review of the effectiveness of the cleanup action every five (5) years.
Containment	Surface Controls	Surface Sealing	Cover materials and sealing techniques are used to stabilize lead-impacted soil, prevent surface water infiltration, control erosion, and isolate and contain contaminant.	Potentially applicable when used in conjunction with other technologies. Has short-term applications. Does not reduce toxicity or volume of contaminants. Future residents could continue to be exposed to properties with lead concentrations in soil exceeding the residential cleanup levels.

SOIL REMEDIATION GENERAL RESPONSE ACTIONS	CLEANUP TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING CONSIDERATIONS
Containment	Surface Controls	Soil Stabilization/Fixation	Chemical stabilizers are sprayed onto bare soils or mulches to coat, penetrate, and bind together the particles. Chemical stabilizers include latex, emulsions, plastic films, oil-in-water emulsions, and resin-in-water emulsions.	Potentially applicable when used in conjunction with other technologies. Has short-term limitations and requires long-term maintenance. Does not reduce toxicity or volume of contaminants. Future residents would continue to be exposed to properties with lead concentrations in soil exceeding the residential cleanup levels. Limits long- term use of properties for gardening and may not support decorative vegetation.
Containment	Surface Controls	Revegetation	Soil is seeded and fertilized to establish vegetation. Plant cover limits soil erosion and exposure to bare soils containing lead.	Potentially applicable when used in conjunction with other technologies. Does not reduce toxicity or volume of contaminants. Future residents would continue to be exposed to properties with lead concentrations in soil exceeding the residential cleanup levels.
In-Situ (In Place)	Onsite treatment	In Place Phytoremediation (Bioremediation)	Properties are fertilized with nitrogen, phosphorus, and potassium. Dolomite lime is also added to the soil to adjust the soil pH to within a range for optimal plant growth and metal uptake. The fertilizers and lime are tilled into the soil to a depth of six (6) to nine (9) inches. Then the areas are mechanically seeded. An irrigation system must be installed to provide adequate moisture for plant growth. Plant growth, potential plant pathogen and pest infestations, and overall crop development must be periodically assessed.	Potentially not applicable. The requirements to ensure plant growth and simultaneously prevent exposure to soils containing lead are difficult to control in residential settings. Gardens would not be accessible to the residents for the duration of the cleanup. May not achieve cleanup goals below 400 ppm lead. Future residents would continue to be exposed to properties with lead concentrations in soil exceeding the residential cleanup levels.
Removal/Excavation	Shallow soil excavation	Backhoe/excavator, hand tools , front-end loader	Lead-impacted soils are physically removed using conventional construction equipment. Maximum limits of excavation typically to 18 inches. The excavation void is backfilled with imported clean soil or treated soil and covered with sod or other drought tolerant landscaping selected by the property owner.	Potentially applicable. Workers may be exposed to contaminants during excavation; therefore, personal protective equipment (PPE) and dust control would be required to prevent worker exposure.

SOIL REMEDIATION GENERAL RESPONSE ACTIONS	CLEANUP TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING CONSIDERATIONS
Removal/Excavation	Offsite landfill	Class I RCRA landfill	Lead-impacted soil and debris are removed and disposed of at an offsite Class I RCRA landfill.	Potentially applicable. Workers may be exposed to contaminants during excavation; therefore, PPE and dust control would be required to prevent worker exposure. Contaminants may be subject to land disposal restrictions. Treatment may be required prior to disposal. Disposal must be at a landfill permitted to receive hazardous wastes.
Removal/Excavation	Offsite landfill	Class II landfill	Lead-impacted soil and debris are removed and disposed of at an offsite Class II landfill	Potentially applicable. Workers may be exposed to contaminants during excavation; therefore, PPE and dust control would be required to prevent worker exposure. Soil treatment may be required prior to disposal. Soil may be used as landfill daily cover.
Removal/Excavation	Offsite landfill	Class III landfill	Lead-impacted soil and debris are removed and disposed of or used for a daily cover at an offsite Class III municipal landfill.	Potentially applicable. Feasible for soil containing low lead concentrations. Workers may be exposed to contaminants during excavation; therefore, PPE would be required to prevent worker exposure. Soil may be used as landfill daily cover.
Removal/Excavation with Onsite Reuse	Onsite fill	Onsite backfill	Treated soil is used as backfill at properties where lead-impacted soil has been removed.	Potentially applicable for treated soil that has concentrations below cleanup standards.
Ex-situ Treatment	Ex-situ Treatment	Soil Washing	Water-based process for scrubbing soils to remove lead by dissolving/ suspending in wash solution or concentration into smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing. For complex wastes, multiple washing stages, (including gravimetric separation to tertiary chemical washing) may be used. Process can be combined with chemical treatment such as stabilization.	Potentially applicable. Best used for lead-impacted soils with a wide variety of heavy metal and organic contaminants. Complex waste mixtures make formulating wash fluid difficult. The wash water would not require separate handling and treatment, because the soil washing system is a closed loop system that includes a water treatment system. Permits would likely need to be obtained for operation of the full-scale treatment system. Excavated soils for treatment would require handling. May not be applicable to soils predominated by silts and clays. Assess applicability with bench scale treatability study. Applicable to coarse grained soils. Soils with low fines content (<20 percent of particles with diameters <2 mm) are easier to process. Most easily implemented when a single metal contaminant occurs in a particular insoluble fraction of soil that can be separated by particle size.

SOIL REMEDIATION GENERAL RESPONSE ACTIONS	CLEANUP TECHNOLOGY	PROCESS OPTION	DESCRIPTION	SCREENING CONSIDERATIONS
Ex-situ Treatment	Ex-situ Chemical Treatment	Solidification/stabilization	Lead-impacted soil is excavated and mixed with lime, cement, or phosphate induced stabilization materials using earth-moving equipment, conveyor systems, pug mills, batch plants, or grout mixing equipment. Lead is physically bound within a stabilized mass (solidification) or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	Potentially not applicable. Best suited for soils with heavy metals. Addition of treatment agents may significantly increase volume. Long-term effectiveness not demonstrated for many contaminant types/reagent formulations. Site-specific treatability studies may be required. May render soils unsuitable for gardening.
Ex-situ Treatment	Ex-situ biological Treatment	Phytoremediation	Plants are used to remove, transfer, stabilize, and destroy contaminants in soils. Lead-impacted soil is excavated, spread on the ground, and vegetated. Contaminants may be organic or inorganic. The processes involved in phytoremediation include enhanced rhizosphere biodegradation phyto-accumulation, phyto-degradation and phyto-stabilization.	Potentially applicable as an innovative treatment process. Still in demonstration stage. The depth of treatment is determined by the type of plant and is usually limited to shallow soils. High concentration of hazardous materials can be toxic to plants. Treatment may be seasonal. Contaminants may be mobilized into the groundwater or bio-accumulated in animals. Remediation may take over two (2) years due to the requirement for multiple planting and harvesting cycles to achieve a cleanup goal of 400 ppm. Process may not be able to achieve residential cleanup levels at 80 ppm. May require use of an impermeable barrier and institutional controls to prevent contaminant mobilization. Harvested plants would be considered contaminated materials requiring disposal.

4.2.3 EVALUATION OF PROCESS OPTIONS

After identifying the potentially applicable cleanup technologies, the technologies and process options are evaluated in greater detail. The criteria are effectiveness, implementability and relative cost. These are described below.

4.2.3.1 Effectiveness

Specific process options are evaluated by considering the following factors:

- Potential effectiveness of a process option to address the estimated areas or volumes of lead-impacted media (i.e. soil) and meet the goals identified in the cleanup objectives.
- Potential impacts to human health and the environment during the construction and implementation phases.
- Reliability and proven effectiveness with respect to the types of contamination and site conditions that would be encountered.

4.2.3.2 Implementability

Implementability refers to the administrative or institutional aspects of using a technology or process. Considered under this criterion are factors such as the ability to obtain necessary permits; the availability and capacity of treatment, storage, disposal services; and the availability of the equipment and workers to implement technology.

4.2.3.3 Relative Cost

Cost plays a limited role in the screening of process options. Relative capital plus operations and maintenance costs are used rather than detailed estimates. The costs for each process option are evaluated on the basis of engineering assessment as high, medium, or low relative to the other process options in the same technology type.

4.3 EVALUATION

The evaluation of the process options for soil remediation is shown on Table 7. Technologies and process options applicable to lead-impacted soil that are screened out on the basis of effectiveness, institutional implementability, or cost are represented Table 7.

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Table 7 – General Response Action Screening Evaluation for Soil Cleanup Action

Soil General Response Action	Cleanup Technology	Process Options	Effectiveness	Implementability	Relative Cost
No action	None	None	Ineffective. Does not achieve Cleanup Action Objectives.	May be implemented at properties with regulatory agency acceptance.	None. No actions are implemented.
Institutional Actions	Access and use restrictions	Land use restrictions	Effectiveness depends on continued future implementation. Does not remediate contamination by itself.	Implementable, but may preclude future beneficial uses of the land under restriction.	Low capital, low maintenance.
Containment	Capping	Native soil cap	Relatively ineffective and unreliable. May not sufficiently reduce infiltration of precipitation because native soils are semi-permeable. Eliminates the direct exposure pathway. Does not reduce the intrinsic toxicity or volume of contamination. Capping without treatment is ineffective in the long term.	Implementable, depending on size of area to be capped. Restricts future land use. Long-term liability is relatively high because untreated wastes remain in place.	Low capital, moderate to high long-term maintenance.
Containment	Surface Controls	Surface Sealing	Ineffective for long-term applications, but may be effective in the short-term when used in conjunction with other technologies. Does not reduce the intrinsic toxicity or volume of contamination.	Implementable	Low to moderate capital, moderate maintenance.
Containment	Surface Controls	Soil Stabilization	Effective for some short-term applications when used in conjunction with other technologies, but not effective over the long term. Does not reduce the intrinsic toxicity or volume of contamination.	Implementable	Low to moderate capital, low to moderate maintenance.

Soil General Response Action	Cleanup Technology	Process Options	Effectiveness	Implementability	Relative Cost
Containment	Surface Controls	Revegetation	Effective when used in conjunction with other technologies, but effectiveness is reduced under drought condition. Does not reduce the intrinsic toxicity or volume of contamination.	Implementable	Low capital, low to moderate maintenance.
Removal	Shallow soil excavation	Backhoe/excavator, hand tools front-end loader	Effective and proven means of reducing the volume of contaminants to low cleanup levels. Lead-impacted soil is physically removed from the property. Maximum limits of excavation typically 18 inches. Requires materials handling that may expose workers to contaminants. Requires confirmation sampling to verify effectiveness of excavation at removing lead-impacted soil.	Implementability would largely depend on contaminant type, area and depth of contamination, current land use, adjacent structures/facilities, underground structures/utilities, and the availability of disposal of consolidation facility to accept the excavated soil. Following excavation and backfilling, land use restrictions are greatly reduced or eliminated.	Moderate capital, low maintenance.
Removal with Offsite Disposal	Offsite landfill	Class I RCRA landfill	Effective and reliable means of disposal for hazardous or designated waste. Minor risk of public exposure to impacted soil during transport to the receiving landfill. DTSC has a policy to reduce the generation of hazardous waste without leaving waste in place.	Implementability would depend on waste characteristics and volume. Permits may be required to transport lead-impacted soil over public roadways. The receiving landfill may impose limits on the weight or volume of lead-impacted soil or the frequency of shipments.	High capital cost of landfill options, low maintenance. Costs for waste stream profiling to satisfy landfill acceptability criteria can be significant.
Removal with Offsite Disposal	Offsite landfill	Class II landfill	Effective and reliable means of disposal for non-RCRA and non-California hazardous wastes in lead-impacted soil. Risk of public exposure to lead-impacted soil during transport to the receiving landfill.	Implementability would depend on waste characteristics and volume. Permits may be required to transport lead-impacted soil over public roadways. The receiving landfill may impose limits on the weight or volume of lead-impacted soil or the frequency of shipments.	Moderate to high capital cost of landfill options, low maintenance. Costs for waste stream profiling costs to satisfy landfill acceptability criteria can be significant.
Removal with Offsite Disposal	Offsite landfill	Class III landfill	Effective and reliable means of disposal for minimally lead-impacted soil. Risk of public exposure to lead-impacted soil during transport to the receiving landfill.	Implementability would depend on waste characteristics and volume. Permits may be required to transport lead-impacted soil over public roadways. The receiving landfill may impose limits on the weight or volume of lead-impacted soil or the frequency of shipments.	Low to moderate capital, low maintenance. Costs for waste stream profiling costs to satisfy landfill acceptability criteria can be significant.

Soil General Response Action	Cleanup Technology	Process Options	Effectiveness	Implementability	Relative Cost
Ex-situ Treatment	Ex-situ physical treatment	Soil Washing	Potentially effective. Process relies on separation of contaminants absorbed onto fine soil particles from the bulk soil. Effectiveness may be limited when attempting to treat predominantly fine-grained soil types (i.e., silts and clays). Would require treatability study to determine effectiveness with properties specific soil types.	Implementable for some contaminant types, but would depend on property and waste characteristics and volume. Process may achieve desirable volume reduction. Secured location and permits to build the treatment support system and to treat hazardous waste are likely required.	Moderate to high capital, moderate to high maintenance.
Ex-situ Treatment	Ex-situ chemical treatment	Solidification/stabilization	Potentially effective at reducing contaminant mobility and potential leaching to groundwater. Improves handling characteristics. Does not reduce the intrinsic toxicity or volume of contaminants. Addition of treatment agents may significantly increase volume. Most appropriate for soil impacted with heavy metals. Process may be reversible. Process is not well demonstrated for organics. Debris may interfere with the complete mixing of treatment agents with impacted soil. Soil may require solids processing/handling prior to treatment. Site-specific treatability studies would be required to determine treatment agent formulation.	Implementable for some contaminant types, but would depend on property and waste characteristics and volume. Vendors likely available.	Moderate capital, low to moderate maintenance.
Ex-situ Treatment	Ex-situ phytoremediation	Phytoremediation	Still in demonstration stage. The depth of treatment is determined by the type of plant and is usually limited to shallow soils. High concentration of hazardous materials can be toxic to plants. Treatment may be seasonal. Contaminants may be mobilized into the groundwater or bio-accumulated in animals. Not proven to be able to achieve residential cleanup levels, therefore a treatability study would be required. May require use of an impermeable barrier and institutional controls to prevent contaminant mobilization. Harvested plants would be considered lead-impacted materials requiring disposal.	Implementability may be impacted by drought conditions, small yards, and the requirement for multiple harvests, but would depend on property and waste characteristics and volume.	Moderate

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4.4 SELECTION OF REPRESENTATIVE CLEANUP ALTERNATIVES

Following an evaluation for the criteria of effectiveness, implementability, and relative cost, processes are chosen to represent the range of process options within a cleanup technology type. The representative processes options are selected by considering those process options that are the most well-established, proven, and reliable over a range of site conditions, and that satisfy the cleanup objectives. One or more representative process options are selected for each technology type to simplify the subsequent development and evaluation of alternatives. More than one process option may be selected from a technology type if the processes are sufficiently different in their performance that one will not adequately represent the other. The selection of representative process options provides more flexibility in the future, when the selected cleanup action is designed. The specific process to be used at a particular property may not be selected until the cleanup design phase. There are many processes and innovative technologies that are recommended for field testing under property-specific conditions prior to final remedy selection.

The eventual remedy or remedies are not limited to these process options. These process options are considered representative of the technologies in the General Response Action grouping after consideration of the effectiveness, implementability, and relative cost. Some categories may not have a representative process option and, conversely, some may have more than one representative process option. The representative process options may be used in conjunction with other response actions.

Furthermore, implementation of some process options alone will not satisfy the cleanup objectives. The options shown in Table 8 were retained by the technology screening process as representative options. These cleanup and treatment technologies are retained because they can individually or in combination with another option, satisfy cleanup objectives for reducing exposure to lead-impacted soil.

4.4.1 EXCAVATION AND OFFSITE DISPOSAL

DTSC prepared the *PT&R* Guidance (see Appendix I) as an option for expediting and encouraging cleanup of sites with elevated concentrations of metals in soil. The approach may be applied at operating or closing hazardous waste facilities and at Brownfields sites. Although expediting cleanup is emphasized, the approach discussed in the guidance is designed to ensure safe, protective cleanup and to maintain DTSC's commitment to public involvement in its decision-making process.

The *PT&R Guidance* is applicable on a case-by-case basis at sites where the primary environmental concern involves soils contaminated with metals. Data collected in the preparation of the guidance documents indicate that excavation and disposal was the most frequently selected cleanup alternative. Containment and capping or consolidation and capping were the next most frequently chosen cleanup alternatives. The selection of a specific cleanup alternative as the preferred approach does not appear to be correlated with impacted volume, contaminant types present, or affected environmental media. Rather, factors affecting selection of excavation and disposal or containment andcapping included proven effectiveness, ability to meet the cleanup timeframes, and the current and reasonably foreseeable future land use.

The excavation and disposal alternative was selected if the objective was to allow unrestricted land use. Containment and capping or consolidation and capping was selected if a cap was compatible with the current and reasonably foreseeable future land use and the associated land use restrictions did not create barriers to implementation with interested parties. A detailed summary of the primary rationale for selecting and rejecting a given technology is provided in the *PT&R Guidance*. Table 8, summarizes the frequency of the NCP criteria used to support selection and rejection of a particular cleanup alternative. In summary, "excavation and offsite disposal" is by far the most common and well developed of the options with multiple potential offsite landfill disposal options.

Table 8, of the guidance, shows that solidification, stabilization, and chemical fixation were rejected for several reasons, including costs, long-term effectiveness, soil volume increases, and time to conduct treatability studies. Soil washing was rejected because of uncertain effectiveness, associated costs, and implementability. The ex-situ treatment technology using soil washing and stabilization is highly dependent on the type of soil and lead concentrations of lead at a property. Property-specific treatability studies can be performed to document the potential effectiveness of a specific technology.

Based on the *PT&R Guidance*, soil excavation is a proven and viable technology for this cleanup. Soil washing and stabilization was considered a potentially viable technology, but was dismissed following a Benchscale Treatablitity Study conducted in January 2017. In addition, phytoremediation, an innovative ex-situ "green technology" utilizing vegetation to remove metals from soil, was also considered a potential technology for this Cleanup Plan. These three technologies are discussed further in the sections below.

Table 8 – Cleanup Options Considered for Sites Evaluated by DTSC Study (PT&R Guidance).

Technology	Number of Site Alternatives Considering Technology	Number of Site Alternatives Analyses Rejecting Technology	Number of Times Rejected During Cleanup Alternative Analysis						
			Overall Protection	Compliance with ARARs	Reduction of Toxicity Mobility, Volume	Long-term Effectiveness	Short-term Effectiveness	Cost	Implementability
Excavation/ Offsite Disposal	183	36	4	0	0	2	1	30	6
Containment by Capping, Capping/ Consolidation, Capping/CAMU	113	78	8	0	1	61	0	13	4
Solidification/ Stabilization, Chemical Fixation	43	38	0	0	13	14	1	17	11
Reuse or Recovery	23	10	3	0	1	2	0	2	6
Soil Washing	21	21	0	0	1	11	0	7	6
Treatment (non-specific)	12	10	0	0	1	1	1	5	4
Vitrification	4	4	0	0	0	0	0	4	1
Soil Flushing/ Leaching	3	3	0	0	0	0	0	2	3
No Action/ ICs	188	181	172	11	0	6	0	0	0

Notes:

ARARs – applicable and or relevant and appropriate requirements
CAMU – corrective action management unit
ICs – institutional controls

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4.4.2 SOIL EXCAVATION

As noted above, soil excavation is a proven technology to remediate metal-impacted properties. To implement soil excavation and disposal, a cleanup plan is needed. The major topics and elements of a soil excavation and restoration plan include the following:

- Site background, nature and extent of contamination;
- Objectives and scope of plan;
- Cleanup organization and schedule;
- Description of the technical basis for the approach (e.g., why excavation/disposal was selected as the cleanup alternative; estimated extent of excavation, estimated volume of soil to be excavated);
- Pre-excavation activities;
- Excavation activities;
- Waste management;
- Backfill and property restoration activities;
- Quality assurance and quality control;
- Health and safety monitoring; and
- Reporting.

Excavation and restoration plan(s) must be supported by the following documents, as applicable:

- Health and safety plan;
- Community air monitoring plan;
- Soil confirmation sampling plan;
- Public participation plan;
- Stockpile sampling plan; and
- Transportation plan.

Selected topics related to the excavation and restoration plan are discussed further in the following sections of the *PT&R Guidance*:

- Selecting excavation locations (Section 5.1);
- Permits, notifications and site preparation (Section 5.2);
- Excavation methodology (Section 5.3);
- Control measures (Section 5.4);
- Air monitoring during excavation (Section 5.5); and
- Field variances (Section 5.6).

4.4.3 INSTITUTIONAL CONTROLS

Where future land uses may not be compatible with residual contamination or where cleanup involves leaving contamination in place, Institutional controls (ICs), also known as administrative controls, are used to stop or reduce the exposure of human and environmental receptors. ICs are non-engineering mechanisms used to ensure that the intended future land use is consistent with cleanup and engineering controls maintain their integrity and effectiveness.

4.4.4 SOIL WASHING AND STABILIZATION

Soil washing is a physical treatment process that uses water and mechanical energy to create a soil slurry and separate it into its constituent fractions of rock, gravel, sand, silt, and clay. Contaminants can be isolated in certain soil fractions. This process is known as physical separation. Chemical additives, such as acid or surfactants, can also be used to remove contamination from the soil.

The soil washing system consists of individual units, or modules, whose selection is based on soil and contaminant characteristics unique to a specific property. The relationship of the soil matrix and the contaminant distribution are the key factors by which physical treatment unit operations are designed and employed. Bench-scale studies are typically conducted prior to the full-scale treatability study to determine the appropriate treatment process for a specific property.

A treatability study of the soil washing and stabilization technologies was conducted at the former McClellan Air Force Base (McClellan AFB), McClellan Park, California, under the guidance of the Strategic Environmental Research and Development Program (SERDP) as part of the National Environmental Technology Test Sites (NETTS) Program. Soil washing and stabilization technologies were tested at two McClellan AFB sites: Potential Release Location [PRL] S-004 and the Small Arms Firing Range [SAFR]). The treatability study and field scale pilot study were designed to evaluate the cost and performance of soil washing as a primary treatment technology and stabilization as a secondary treatment technology. This section summarizes the findings that were presented in the Technology Application and Analysis Report (TAAR) and more case study details are presented in Appendix J. A process flow diagram for the soil washing and stabilization pilot study is presented in Figure 12.

The results of the soil washing and stabilization full-scale treatability study at the two military sites were used to design a field scale pilot test and evaluate the performance of the soil washing and stabilization technologies and to determine the cost for full-scale implementation of these technologies.

At the first McClellan AFB soil washing test site (PRL S-004), the treated soil achieved a concentration of 179 ppm, compared to the initial feed soil concentration of 298 ppm; the remedial efficiency is therefore estimated to be 39.76 percent. The combined soil fraction represents 53.79 percent of the initial soil volume. The soil from the second McClellan AFB SAFR showed a contaminant reduction of 68 percent and a volume reduction of 74 percent, but the treated soil did not achieve the USEPA regional screening level of 400 ppm. These limited data suggest that as a remediation strategy, soil washing has a highly variable effectiveness that depends heavily on the specific characteristics of the soil and contamination at the site. It also raises a question as to whether the technology has the capability to reduce contamination to a level that would meet the cleanup objectives for this project (80 ppm). The results of the treatability study at the two McClellan AFB sites are discussed in more detail in Appendix J.

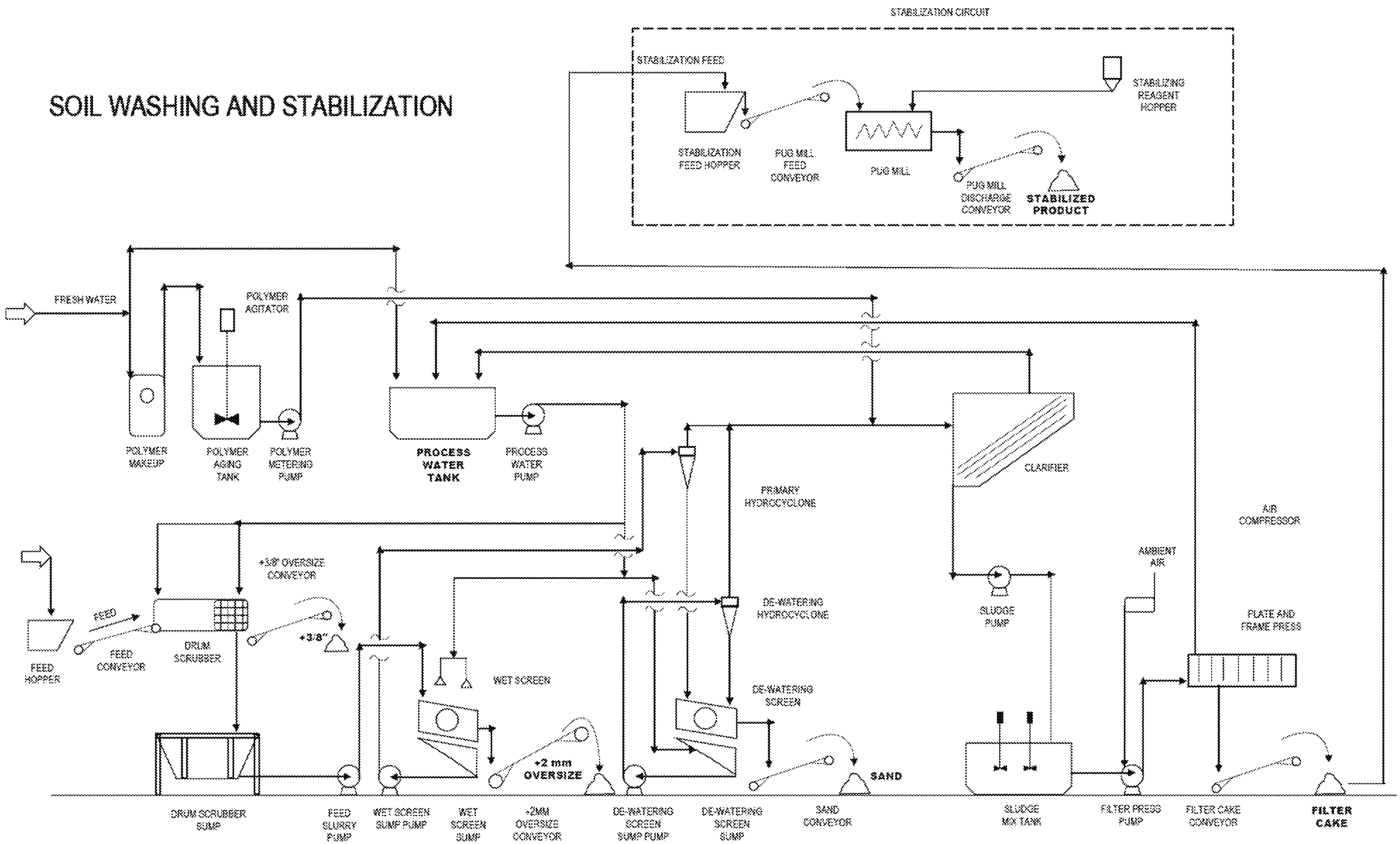

Figure 12 – Soil Washing & Stabilization Process Flow

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In summary, the soil washing and stabilization technologies were able to reduce soil concentrations and impacted soil volume; however, the performance was variable from site to site, which could be problematic for meeting stringent cleanup goals. In addition, the field implementation of such a technology within the PIA could face challenges including, but not limited to, permitting, land availability where the treatment units could be constructed, timeframe for soil treatment, and community acceptance of reuse of treated soil. However, further site-specific treatability testing was considered because a soil treatment option may reduce other environmental impacts such as achieving a reduction in overall volume of soil requiring offsite landfill disposal and reductions in associated air pollution associated with transporting large volumes of impacted soil on the roadways to the offsite landfills.

Accordingly, in January 2017, a soil washing bench scale study (bench study) was performed to determine how well this technology could work on soil types in the PIA. Results of the test were made available in late January 2017 to allow community members to review the findings of the test and provide comments regarding soil washing before the close of the Draft Cleanup Plan and Draft EIR public comment period. The bench study used ten representative samples of PIA site soils to evaluate whether the lead impacts are confined primarily to the fine particles (typically clays and silts) within the soil and whether these fine particles can be separated from the coarser particles (sands and gravels) within the soils and handled separately (i.e. disposal). The treatability study showed that there would be significant challenges with meeting the DTSC lead cleanup goal of 80 ppm. These challenges include the high percentage of fine particles in the soils of properties within the PIA, and little significant segregation of lead into the fine particles. The combined soil sample results indicated that only the gravel fraction contained lead below 80 ppm (DTSC's screening level for lead in residential soils); and gravels generally made up only 13 percent of the soils sampled. Consequently, a large portion of the soil would still require offsite disposal and this soil would need to be replaced by the import of clean soil from an offsite source. The estimated cost of disposal of contaminated soil generated from soil washing would be approximately \$553 per ton versus \$312 per ton to excavate and dispose of contaminated soil or approximately 77% higher than offsite disposal.. Overall, the estimated cost of using soil washing as a cleanup option would be approximately \$65,400 per property, which is 30% higher than the excavate and disposal option (Alternative 3). In addition, it is estimated that an additional 1,380 metric tons of greenhouse gasses (GHGs) would be produced as a result of the soil washing treatment option; this is largely because of the additional energy use by specialized equipment. The additional costs for soil treatment, disposition, and importing clean soil, the additional environmental impacts (i.e. greenhouse gases), and other logistical requirements invalidates soil washing as a practical and cost-effective alternative to typical excavation and direct disposal of lead-contaminated soil. See Appendix O for further details.

4.4.5 PHYTOREMEDIATION

Phytoremediation is an innovative technology that uses specially-selected, metal-accumulating plants to clean up soil impacted with heavy metals. Certain plants, known as metal hyper-accumulators, accumulate unusually high concentrations of heavy metals in their tissue. Phytoremediation takes advantage of the ability of such plants to extract metals from the soil with their roots and to concentrate these metals in aboveground plant tissues. The accumulation of metals within the plants greatly reduces the amount of impacted soil that requires disposal, thereby decreasing the associated disposal fees. The metal-rich plant material can be safely harvested and removed from the property without extensive excavation, disposal costs, and loss of topsoil associated with traditional remediation practices.

Phytoremediation can be used in-situ (in-place treatment without excavating the soil) or ex-situ (excavated soil treated at a secure area). Regardless of the method, it may take several years to clean up a property depending on the degree of contamination and the degree to which the vegetation thrives. And, depending on the types of plants used, the areas must be fenced off to prevent animals from eating the vegetation. While phytoremediation shows promise, its application is still under development and has limitations.

The success of phytoremediation is dependent on several factors. Plants must produce sufficient biomass and be responsive to agricultural practices while accumulating high concentrations of metal. The availability of metal in the soil for plant uptake is another variable for successful phytoremediation. Lead, for example, has limited solubility in the soil and is not generally available for plant uptake.

The use of soil amendments and planted systems to stabilize lead in soil is effective (USEPA, 2007). However, because lead is only sparingly bioavailable in soil, phyto-extraction is ineffective. Significant research has gone into the use of soil chelators to enhance bioavailability of lead, but these amendments can cause the indiscriminate increase of lead mobility, and leaching of the chelated lead into surface and groundwater while not being very effective for increasing lead uptake by plants (Chaney et al., 2007).

A case study, presented in Appendix K indicated that phytoremediation was partially successful at achieving a cleanup goal of 800 ppm for a residential area of 1,081 square feet. It is uncertain if the residential property was occupied at the time the study was conducted. The field was seeded with *Brassica juncea* (Indian Mustard). Soil solution lysimeters were installed at two depths (18 and 24 inches) to monitor the soil solution. An overhead sprinkler irrigation system was installed and irrigation was scheduled to maintain the soil moisture at optimum levels for plant growth and metal uptake. Soil amendments were added to each crop, based on the results obtained in the treatability study, to enhance plant growth and metal uptake. The crop of *Brassica juncea* was harvested after 6 weeks growth and the plot replanted immediately after harvest. The harvested biomass was dried, removed from the plot, and analyzed for lead content.

After harvesting the plant material, soil samples were collected at three depths at the same locations as the initial sampling with additional surface (0-6 inches) soil samples collected on a 3-foot grid spacing to determine metal removal efficiency. The soil samples were air dried and analyzed for total metal content using a modification of USEPA Method 3050. This process (planting, harvesting, sampling) was repeated for three crops. Winter rye was planted at the end of the season as a cover crop for the winter.

At the time of the initial sampling, 68 percent of the selected area was above 800 ppm and about 25 percent of the selected area exceeded 1,000 ppm. After three phytoremediation cropping cycles, none of the treated area exceeded 800 ppm. However, none of the samples were below 400 ppm. It is uncertain if six cycles would treat soils to levels below the concentrations of the study. However, if implemented in the PIA, the duration is likely to be 2 years or more per property to achieve 80 ppm - the cleanup goal. In general, in-situ phytoremediation would not be feasible in a residential community, if the property is occupied, as the yards would be rendered un-useable for the duration of the cleanup.

Ex-situ phytoremediation may be considered as an option, provided a secured location can be found. The limitations regarding seeding, irrigating and harvesting would be similar to those of in-place phytoremediation. To implement this option, clean backfill would need to be secured and placed at properties that are excavated. The treated soil would be mixed with clean soil to offset the need for additional offsite clean soil. The excavations of properties would require heightened degree of timing so as not to stockpile soils and to have just the correct volume of soil for the location that is secured for treatment. The ex-situ treatment site would require regular maintenance, treating for pests, and replanting plants that do not thrive. In the context of Southern California's water-scarce environment, the irrigation of plants would require special arrangement or authorization. Given these limitations and the number of properties located within the PIA area that are likely to require cleanup, ex-situ phytoremediation is also not a viable option.

4.5 EVALUATION OF CLEANUP ALTERNATIVES

In Section 5.0 below, Table 10 presents the evaluation of three proposed cleanup alternatives. The alternatives include two alternatives featuring soil excavation and offsite disposal and the required No Action Alternative for comparison purposes. In addition, the two additional soil disposition options presented above (i.e., soil washing and phytoremediation) that could replace or supplement offsite soil disposal are included as well. As stated in the previous section, in-situ or ex-situ phytoremediation is not a viable soil treatment option for this cleanup, but it is included for comparison purposes. In addition, the soil washing bench scale study showed that there would be significant challenges with meeting the cleanup goal of 80 ppm. As such, soil washing and stabilization is not a potential treatment option to reduce the toxicity of the soil and reduce the volume of waste disposed at landfills. This alternative is also included for comparison purposes.

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5.0 SCREENING OF CLEANUP ACTION ALTERNATIVES

This section identifies the proven cleanup technologies applicable to addressing lead in soils at properties within the PIA and to evaluate relevant information concerning each of the cleanup action alternatives. The proven cleanup approaches presented herein prescribe the most appropriate cleanup alternatives for sites with lead in soil based on technologies that have been consistently applied at similar sites as described in DTSC's *PT&R Guidance* (DTSC, 2008).

The *PT&R Guidance* presents a detailed review of technologies for similar cleanup action scenarios to refine the number of remedies considered in this Cleanup Plan. The *PT&R Guidance* document determined that certain technologies were routinely omitted from consideration on the basis of their effectiveness, implementability, and cost, or were not selected under the nine-criteria analysis identified in the NCP. Conversely, it was noted in the *PT&R Guidance* that certain technologies were routinely selected for cleanup of specific types of sites impacted with specific types of chemicals. Based on the analysis presented in the *PT&R Guidance* and a comparison to the cleanup objectives proposed for cleanup within the PIA in this Cleanup Plan, DTSC considers the *PT&R Guidance* to be equivalent to the screening and evaluations that would otherwise be conducted under a site-specific Feasibility Study. However, cleanup technologies were evaluated in Section 4.0 in accordance with the NCP. Cleanup alternatives consisting of soil excavation and removal were evaluated with consideration as to the appropriateness of a removal action under the factors promulgated in 40 CFR § 300.415(b)(2). In addition, Ex-Situ Soil Washing and Stabilization was proposed for a site-specific treatability study with soil generated from the PIA during the cleanup process to confirm that the technology is a viable process option that would achieve the target cleanup goal, reduce the volume of waste generated from the PIA, and potentially reduce the environmental impact due to reduction in truck traffic.

5.1 DESCRIPTION OF CLEANUP ALTERNATIVES

The following sections present a brief description of each alternative considered for detailed analysis. All three of the alternatives assume that sampling and analysis, data evaluation, and prioritization of each property within the PIA will be conducted before cleanup is undertaken.

5.1.1 ALTERNATIVE 1 – NO ACTION

DTSC is required by law to evaluate a No Action alternative. This alternative proposes to take "no action," which means the proposed cleanup would not take place. The environmental effects resulting from taking no action serve as a baseline condition, and effects of the proposed cleanup or an alternative cleanup are compared to this baseline condition..

5.1.2 ALTERNATIVE 2 – LEAD HAZARD REMOVAL AND OFFSITE DISPOSAL

The *Lead Hazard Removal Alternative* would remove the hazard of exposure to lead-impacted soils by removing the top most layer of soil until a representative soil lead concentration of 400 ppm is achieved.

California Code of Regulations, title 17, Section 35036 defines lead-impacted soil as bare soil that contains an amount of lead equal to, or in excess of, 400 ppm in children's play area and 1,000 ppm in all other areas. Soil containing lead at concentrations in excess of a representative soil lead concentration of 400 ppm is considered contaminated soil and a potential lead hazard. The Center for Disease Control (CDC) recommends proactive removal of lead hazards before children's blood lead levels become elevated.

The *Lead Hazard Removal Alternative* would consist of removing lead-impacted soil in 6-inch layers. Upon completion of excavating 6 inches of soil, the excavation area from either the front yard, back yard, side yard (as applicable) or drip zone would be evaluated as a Decision Unit. The Decision Unit would be sampled onsite using XRF equipment with lab confirmation until the post-remediation exposure concentrations for the property are less than a representative soil lead concentration of 400 ppm or a maximum depth of 18 inches is excavated. The excavated soil would be characterized to determine the appropriate classification for disposal. Soil washing and stabilization of the excavated soil was considered as a supplemental action to this alternative because it may reduce the overall volume of soil required for offsite disposal and air pollution associated with transporting large volumes of impacted soil on the roadways to offsite landfills. Clean fill would be sampled, in accordance with DTSC's *Clean Imported Fill Material Guidance* (within Appendix E-4). Clean fill with lead concentrations less than 40 ppm would be used as backfill to cap the residual lead remaining in the soil. Sod or other appropriate soil cover would be used to restore the property. Residential properties cleaned up to a representative soil lead concentration of 400 ppm would require land use controls and maintenance LUCs or ICs to prevent the potential future exposure of sensitive individuals to soil above a representative soil lead concentration of 80 ppm. LUCs are relatively low cost and effective in preventing direct contact between contaminants and potential receptors, provided controls are properly maintained; however, LUCs would require a five (5)-yearreview.

5.1.3 ALTERNATIVE 3 – RISK- BASED REMOVAL AND OFFSITE DISPOSAL

The *Risk-Based Removal Alternative* would remove the risk posed by lead soils at levels above 80 ppm. Bare surface soil containing lead at concentrations in excess of a representative soil lead concentration of 80 ppm may increase a child's blood lead level by 1 µg/dL. This increase in a young child's blood lead level has been linked to a one point decrease in IQ.

The *Risk-Based Removal Alternative* would consist of removing lead-impacted soil to the excavation depth established with the pre-excavation confirmation sampling discussed in Section 6.8. Upon completion of soil excavation, the front yard, back yard, side yard, as applicable, or drip-zone would be evaluated as a Decision Unit. The Decision Unit would be screened onsite using XRF meters with lab confirmation until the Post-Cleanup Evaluation conducted in accordance DTSC's *PT&R Guidance* achieves an exposure concentration for the property of less than a representative soil lead concentration of 80 ppm or a maximum depth of 18 inches is excavated.

The excavated soil would be characterized to determine the appropriate classification for disposal. Clean fill would be sampled, in accordance with DTSC's Clean Imported Fill Material Guidance. Clean fill with lead concentrations less than 40 ppm would be used as backfill. Sod or other appropriate soil cover would be used to restore the property. Properties cleaned up to a representative soil lead concentration of 80 ppm would not require land use controls to prevent the potential future exposure of sensitive individuals.

5.1.4 AVERAGE AND CUMULATIVE SOIL REMOVAL PARAMETERS

Both Alternatives 2 and 3 feature soil removal and offsite disposal with the primary difference being the overall cleanup goal (i.e., representative soil lead concentration of 400 and 80ppm, respectively), as presented in Sections 5.1.2 and 5.1.3. For either alternative, the overall volume of soil excavation is contingent on the overall depth of excavation. To achieve the cleanup objectives, properties within the PIA would require removal of lead-impacted soil at depths ranging from 6, 12 or 18 inches as shown in Table 9.

To determine the excavation volumes a study of the sensitive land use properties in the PIA was used to calculate the volumes and weight of soil to be excavated for an average property (see Appendix L, Environmental Impact Report). Assuming an average excavation area of 1,214 cubic feet per property and various excavation depths of 6, 12, or 18 inches, approximately 23 to 67 cubic yards per parcel could be excavated. Using an average density of 1.3 tons per cubic yard, an estimated 29 to 88 tons of material could be excavated from each property.

Table 9 – Volume and Weight of Soil Removal Based on Excavation Depths

	Depth (ft)	Volume of soil (ft^3/property)	Volume of soil (yd^3/property)	Weight of soil (tons/property)
6 inches	0.50	607	22.5	49.3
12 inches	1.00	1214	45.0	58.5
18 inches	1.50	1821	67.4	87.6

SOURCE: ESA PCR 2016

The excavated lead-impacted soil is anticipated to be transported to one or more of the following facilities:

- Chiquita Canyon Landfill in the northwestern part of Los Angeles County;
- Simi Valley Landfill in eastern Ventura County;
- Kettleman Hills Landfill in Kings County (San Joaquin Valley);
- La Paz Landfill in southwest Arizona; and
- South Yuma Landfill in southwest Arizona.

5.2 EVALUATION OF CLEANUP ALTERNATIVES

The evaluation of the three cleanup alternatives presented in Section 5.1 was informed by CERCLA's nine-criteria analysis in the NCP and removal action selection criteria under the NCP. The nine NCP criteria are broadly grouped together as threshold, balancing, and modifying criteria as presented below. Consistent with NCP guidance, to be selected, an alternative must meet the threshold criteria. Then the balancing criteria are applied to identify the alternative(s) that best meet(s) these criteria. The modifying criteria are applied to refine the selection of the preferred alternative(s).

Threshold Criteria relate to statutory requirements that each alternative must satisfy in order to be eligible for selection. These are:

- **Overall Protection of Human Health and the Environment** - Describes how the alternative as a whole would achieve and maintain protection of human health and the environment. It evaluates protection of human health in terms of the potential risks that remain after cleanup objectives have been met.
- **Compliance with ARARs** - Describes how the alternatives comply with ARARs.

Balancing Criteria are the technical criteria that are considered during the detailed analysis. The technologies identified as being most practicable for cleanup have, therefore, been evaluated in light of the following feasibility study balancing criteria:

- **Long-Term Effectiveness** - Each alternative is assessed in terms of its long-term effectiveness in maintaining protection of human health and the environment after response objectives have been met. The magnitude of residual risk and adequacy and reliability of controls are taken into consideration. Some aspects of long-term effectiveness could include the ability of a soil backfill cover to maintain its integrity. Long-term effectiveness also includes an evaluation of the magnitude of residual risk. In evaluating this criterion, long-term management of the site is an important consideration.
- **Reduction of Toxicity, Mobility, and Volume through Treatment** - Evaluates the anticipated performance of each alternative with respect to the following factors:
  - Volume of hazardous substances that would be treated or destroyed;
  - Degree of expected toxicity, mobility, and volume reduction as compared to conditions prior to the cleanup action;

  - Degree to which total destruction is achieved;
  - Type and quantity of residual chemical compounds; and
  - Degree to which the alternative addresses the property risk.

- **Short-Term Effectiveness** – Evaluates the effects of each alternative during construction, implementation, and operation. Factors considered include protection of the community and workers during cleanup operations, the time required to implement the alternative and to achieve the target cleanup goal, and the potential adverse environmental impacts that may result.
- **Implementability** – Each alternative is assessed in terms of its technical and administrative feasibility and the availability of required goods and services. Also considered is the reliability of the technology, the ability to monitor the effectiveness of the remedy, and the ease of undertaking additional response actions, if necessary.

Administrative implementability is the relative difficulty of coordinating and obtaining approvals from other agencies to perform certain cleanup activities. As an example, the implementability of bringing in truckloads of backfill material would depend on the source of the material and accessibility to the property.

- **Cost** – Each alternative is assessed in terms of its present worth in capital and operations and maintenance (O&M) costs. Capital and O&M costs were prepared using 2016 dollars for construction in Southern California. In preparing the capital and O&M cost estimates, per federal NCP guidance, the costs are bracketed within a +50 to -30 percent range to take into account potential contingencies. This approach is typical for the preparation of cost estimates for feasibility study and Cleanup Plan documents.

Modifying criteria are formally assessed after the public comment period. However, state or community views are considered to the extent they are known or can be evaluated. General descriptions of these criteria are provided. However, consideration of these criteria is deferred until after the public comment period, and would be incorporated as needed, based on comments received. The modifying criteria are as follows:

- **Regulatory Agency Acceptance** – Evaluates the anticipated administrative and technical issues that state or other agencies may have concerning the alternative. Actual assessment of regulatory agency acceptance is dependent on comments received during the public comment period.
- **Community Acceptance** – Evaluates each alternative in terms of currently available public input and the anticipated public reaction to the alternative. However, actual assessment of community acceptance is dependent on comments received during public comment period.

In addition, cleanup plans prepared or approved pursuant to Health and Safety Code section 25356.1 should consider the following factors, to the extent that these factors are consistent with the federal regulations and do not require a less stringent level of cleanup than the federal regulations:

1) Health and safety risks posed by the conditions at the site;

2) Effect of contamination or pollution levels upon present, future, and probable beneficial uses of contaminated, polluted, or threatened resources;
3) Effect of alternative remedial action measures on the reasonable availability of groundwater resources for present, future, and probable beneficial uses;
4) Site-specific characteristics, including the potential for offsite migration of hazardous substances, the surface or subsurface soil, and the hydrogeologic conditions, as well as preexisting background contamination levels;
5) Cost-effectiveness of alternative remedial action measures; and
6) Potential environmental impacts of alternative remedial action measures, including, but not limited to, land disposal of the untreated hazardous substances as opposed to treatment of the hazardous substances to remove or reduce its volume, toxicity, or mobility prior to disposal.

5.3 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section summarizes how well each alternative satisfied each evaluation criterion and indicates how it compares with the other alternatives under consideration. The evaluation is summarized with relative merits in Table 10.

5.3.1 ALTERNATIVE 1 – NO ACTION

The *No Action Alternative* was included to provide a baseline for evaluating the other alternatives. In this alternative, it was assumed that no cleanup action occurs within the PIA.

Typically, assessment of overall protection of human health and the environment is based largely on the degree of certainty that an alternative can meet the established cleanup objectives, meet the short- or long-term effectiveness criteria, or reduce the toxicity, mobility, or volume of lead in soil. As discussed in Section 3.0, the overarching cleanup objective is the following:

- Protect the current and future health of the residential population from exposure to lead in soil that presents an unacceptable risk through ingestion, inhalation, and direct or dermal contact.

Alternative 1 does not include any active soil removal; therefore, the lead in soils would continue to be present in the PIA. Therefore, Alternative 1 does not address the cleanup objectives,

An evaluation of this alternative with respect to the three sets of NCP criteria is presented below.

Threshold Criteria

- The No Action Alternative is not protective of human health or the environment and does not comply with ARARs.

Balancing Criteria

- Because there is no action under Alternative 1, this alternative does not meet the criterion for achieving short or long-term effectiveness, reduction in toxicity, mobility, or volume of lead in soil. Alternative 1 is implementable; but infeasible because it would not address the overarching cleanup objective.

Modifying Criteria

- The No Action Alternative is not acceptable to the community and DTSC will not select it.

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Table 10 – Evaluation of Cleanup Alternatives

Case Studies Criteria	Alternative 1 No Action	Alternative 2 Lead Hazard Removal & Offsite Disposal	Alternative 3 Risk Based Removal and Offsite Disposal	Alternative Soil Disposal Options (Versus Offsite Landfill Disposal) Ex-situ Phytoremediation	Alternative Soil Disposal Options (Versus Offsite Landfill Disposal) Soil Washing & Stabilization
OVERALL PROTECTIVENESS					
Human Health Protection: Direct Contact, Ingestion & Inhalation	No reduction in risk.	Protects against Contact, Ingestion & Inhalation.	Protects against Contact, Ingestion & Inhalation.	Ex-situ phytoremediation would require securing a treatment area within the PIA.	Protects against Contact, Ingestion & Inhalation.
Environmental Protection: Unrestricted/Residential Land Use	No.	No.	Yes.	Unknown.	No. Bench scale study indicated cleanup objectives could not be achieved.
Environmental Protection: Impacted Soil, Disposal or On-site Treatment	No.	Requires disposal of soil at class I, II, or III landfill. Requires disturbing borrow sites for clean backfill.	Requires disposal of soil at class I, II, or III landfill. Requires disturbing borrow sites for clean backfill.	Requires site controls to prevent wildlife or people from ingesting the vegetation placed on site. Requires irrigation during a drought to ensure vegetation grows. Requires acquisition of property for duration of cleanup efforts. (ex-situ)	Requires disposal of soil fines at class I, II, or III landfill Requires disturbing borrow sites for clean backfill.
COMPLIANCE WITH ARARS					
Chemical Specific ARARs: Lead	Does not meet acceptable concentrations for residential use.	Yes.	Yes.	May not meet acceptable concentrations for residential use.	Does not meet acceptable concentrations for residential use.
Location-Specific ARARs: Residential	Does not meet acceptable concentrations for residential use.	Yes.	Yes.	Unknown. May not meet acceptable concentrations for residential use.	Does not meet acceptable concentrations for residential.
Action-Specific ARARs: Residential	Assumes no cleanup action is taken.	Yes.	Yes.	Yes.	Yes.
Other Criteria and Guidance	Does not meet guidance for lead in sensitive land use designations.	Standard Construction Best Management Practices.	Standard Construction Best Management Practices.	Permit likely required for In-situ and ex-situ treatment.	Permit is required.
LONG-TERM EFFECTIVENESS AND PERMANENCE					
Magnitude of Residual Risk: Direct Contact/Soil Ingestion	No reduction in risk.	Yes. Soil is removed and replaced with clean soil.	Yes. Soil is removed and replaced with clean soil.	Unknown. May not meet acceptable concentrations for residential use.	No. Does not meet acceptable concentrations for residential use.
Magnitude of Residual Risk: Ingestion for Existing Users	No reduction in risk.	Hazard is removed. Risk may be reduced.	Risk is removed.	Risk may be reduced.	Risk is reduced.

Case Studies CRITERIA	ALTERNATIVE 1 NO ACTION	ALTERNATIVE 2 LEAD HAZARD REMOVAL & OFFSITE DISPOSAL	ALTERNATIVE 3 RISK BASED REMOVAL AND OFFSITE DISPOSAL	ALTERNATIVE SOIL DISPOSAL OPTIONS (VERSUS OFFSITE LANDFILL DISPOSAL) EX-SITU PHYTOREMEDIATION	 SOIL WASHING & STABILIZATION
Magnitude of Residual Risk: Ingestion for Future Users	No reduction in risk.	Hazard is removed Risk may be reduced.	Risk is removed.	Risk may be reduced.	Risk is removed.
Adequacy and Reliability of Controls	None required.	Yes.	None required.	Required during treatment – unworkable to control in a residential setting for in place treatment.	Controlled at remote location within the PIA.
Need for five (5)-Year Review	No.	Yes.	Not Required.	Not Required.	Not Required.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT					
Treatment Process Used	No Action.	Removal and disposal.	Removal and disposal.	In-Situ or Ex-Situ phtyoremediation.	Stabilization of soil fines prior to disposal or reuse.
Amount Destroyed or Treated	No reduction in toxicity, mobility or volume.	Not destroyed or treated.	Not destroyed or treated.	Potentially treat soils. Treatability Study required.	Less volume than Alternatives 2 & 3 disposed at landfill.
Reduction of Toxicity, Mobility, or Volume	None.	Less volume than Alternative 3, excavated and disposed at landfill.	More volume than Alternative 2, excavated and disposed at landfill.	Potential reduction in toxicity, mobility or volume. Treatability Study required.	Potential reduction in toxicity, mobility or volume. Treatability Study required.
Permanence of Treatment	Not Required.	Yes.	Yes.	Yes.	Yes.
Type and Quantity of Residuals Remaining After Treatment	Lead in soils.	Soil above 400 ppm excavated and removed.	Soil above 80 ppm excavated and removed.	Treatability Study required.	Treatability Study required.
Preference for Reduction of Inherent Hazards Posed by Site	No.	Removes hazard posed by soils containing elevated levels of lead.	Removes hazard posed by soils containing elevated levels of lead.	Requires permit to treat wastes.	Requires permit to treat wastes.
SHORT-TERM EFFECTIVENESS					
Community Protection	Continued exposure to sensitive individuals.	Mitigation measures in place exposure removed.	Mitigation measures in place exposure removed.	Potential exposure during In-situ bioremediation site controls are required.	Mitigation measures in place. Exposure removed.
Worker Protection	None.	Mitigation measures in place Exposure removed.	Mitigation measures in place exposure removed.	Mitigation measures in place. Exposure removed.	Mitigation measures in place. Exposure removed.

Case Studies Criteria	Alternative 1 No Action	Alternative 2 Lead Hazard Removal & Offsite Disposal	Alternative 3 Risk Based Removal and Offsite Disposal	Alternative Soil Disposal Options (Versus Offsite Landfill Disposal) Ex-situ Phytoremediation	Soil Washing & Stabilization
Environmental Impacts	No reduction in risk to environment.	Impact to surficial landscape at residential properties, schools, parks, day care centers, and child care facilities.	Impact to surficial landscape at residential properties, schools, parks, day care centers, and child care facilities.	Potential exposure during in-situ bioremediation. Site controls are required.	Impact to landscape at residential properties, schools, parks, day care centers, and child care facilities. Generates waste water.
Time Until Action is Completed	Six (6) months.	Two (2) years for all properties.	Two (2) years for 2,500 properties.	Two (2) years per property.	Unknown but greater than Alternatives 2 & 3. Treatability study required.
IMPLEMENTABILITY					
Ability to Construct and Operate	No construction or operation.	Easily constructed and operated Requires transportation plan May require a deed restriction for soils above 80 ppm.	Easily constructed and operated Requires transportation plan.	Requires regular onsite controls, irrigation installation, and vegetation replacement.	Requires bench scale testing, remote and secure offsite location, and construction and transportation Plan.
Ease of Doing More Action if Needed	Yes.	Yes, can be combined with treatment-soil stabilization.	Yes, can be combined with treatment-soil stabilization.	In-situ can be combined with surface controls.	No.
Ability to Monitor Effectiveness	Not effective.	Confirmation sampling.	Confirmation sampling.	Requires onsite controls, irrigation installation.	Confirmation sampling.
Ability to Obtain Approvals and Coordinate with Other Agencies	Not required.	Yes.	Yes.	Ex-situ likely to require permits.	Likely to require permits.
Availability of Services and Capacities	Not required.	Soil may be used as landfill daily cover.	Soil may be used as landfill daily cover.	Specialized vegetation, pest control, and revegetation.	Soil may be used as landfill daily cover.
Availability of Equipment, Specialist, and Materials	Not required.	Small excavation equipment and hand tools.	Small excavation equipment and hand tools.	Small excavation equipment and hand tools.	Small excavation equipment and hand tools.
Availability of Technologies	Not required.	Yes.	Yes.	Yes.	Yes.
COST					
Capital Cost	No Costs.	$58,574 (per property, plus maintenance) NCP RANGE (-30% to +50%): $76,146 to $87,861	$50,397 (per property) NCP RANGE (-30% to +50%): $35,278 to $75,595	$20,000 (per property) USEPA RACER Estimate (-30% to +50%): $14,000 to $30,000	$65,400 (per property)

Case Studies Criteria	Alternative 1 No Action	Alternative 2 Lead Hazard Removal & Offsite Disposal	Alternative 3 Risk Based Removal and Offsite Disposal	Alternative Soil Disposal Options (Versus Offsite Landfill Disposal) Ex-situ Phytoremediation	Alternative Soil Disposal Options (Versus Offsite Landfill Disposal) Soil Washing & Stabilization
First Year Annual O&M Cost	No Costs.	Cap maintenance required.	Not required.	Not required.	Not required.
COMMUNITY ACCEPTANCE					
	Not Acceptable.	Not Acceptable.	Acceptable.	--	Not widely acceptable
STATE SUPPORT/AGENCY ACCEPTANCE					
	Not Acceptable.	Not Acceptable.	Acceptable.	--	Not acceptable. Does not meet target cleanup goal.

5.3.2 ALTERNATIVE 2 – LEAD HAZARD REMOVAL AND OFFSITE DISPOSAL

The *Lead Hazard Removal Alternative* (Alternative 2) involves the excavation and offsite disposal of lead-impacted soil until post remediation lead concentrations are below a representative soil lead concentration of 400 ppm for properties within the PIA. The total amount of soil excavated would depend on contamination found at depths greater than 6 inches to a maximum depth of 18 inches bgs. The soil would be excavated in 6-inch layers and analyzed to determine if additional excavation is necessary. Excavation would discontinue when soil contamination is at concentrations that do not exceed a post-remediation representative soil lead concentration of 400 ppm. Excavation and offsite disposal would be an effective means of removing soil that residents are most likely to be exposed to and the soil that generally has the highest concentrations of lead in the top 6-inches. Due to remaining concentrations of lead above 80 ppm, ICs, such as administrative and legal controls or LUCs, including engineering and physical barriers, such as fences and security guards, or both would be required to prevent or mitigate adverse impacts. ICs typically are designed to work by limiting land use or by providing information that helps modify or guide human behavior at a property. In addition, ICs would require a 5-year review.

An evaluation of this alternative with respect to the three sets of NCP criteria is presented below.

<u>Threshold Criteria</u>

- Overall Protection of Human Health and the Environment – Alternative 2 would meet the cleanup objectives and is moderately protective of human health and the environment overall.
- Compliance with ARARs – Alternative 2 could be conducted in accordance with federal and state ARARs contained in Appendix F.

<u>Balancing Criteria</u>

- Long-Term Effectiveness – Alternative 2 would reduce the exposure pathway to lead in soil at remediated properties within the PIA to levels that are no longer considered hazardous in accordance with CDPH guidelines.
- Reduction in Toxicity, Mobility, or Volume – The highest concentrations of lead in soil at properties is within the shallowest soil (less than 18 inches bgs) and would be removed from each residence exceeding the representative soil lead concentration above 400 ppm. Excavation and offsite disposal does not result in the reduction of toxicity or volume of contaminants from an offsite perspective, because the lead in soil is merely moved from one location to another.

However, by placing the lead-impacted soil in an engineered landfill suitable for receiving these concentrations of lead, the mobility would be greatly reduced. Further, the remaining soil that would be left in place would be covered to reduce mobility due to storm water runoff, erosion by wind, or other erosive mechanisms.

- Short-Term Effectiveness – Potential short-term risks to onsite workers, public health, and the environment could result from dust or particulates that may be generated during soil excavation and handling. These risks could be mitigated using PPE for onsite workers and engineering controls, such as dust suppression and additional vehicle and equipment operation safety procedures, for protection of the surrounding community. The short-term risks are viewed as low to moderate. Dust monitoring would be conducted to confirm that dust mitigation measures are adequate. Residents would have the option, upon request, to temporarily relocate while field activities are being conducted at their property.

- Implementability – Alternative 2 is technologically feasible and readily implementable. This alternative relies on common proven technology, uses readily available equipment and labor, and requires minimal permitting to implement initially.
- Cost – Alternative 2 costs are driven primarily by the costs associated with soil excavation, transport, and offsite disposal, operation and maintenance costs. The initial capital costs would be driven by the method of excavation, the excavation volume, and the waste classification of the excavated soil, which in turn determine the costs of transportation and disposal. A cost analysis based on standard industry practices and assumptions is presented in Table 11 below. The cost analysis at this stage of the cleanup process is preliminary and is assumed to be within +50 to -30 percent of the actual cleanup costs.

Modifying Criteria

- Community Acceptance – Alternative 2 is perceived by the community as not sufficiently protective. However, in some circumstances, such as when the soil is not readily accessible, a goal of 400 ppm may be acceptable. Based on experience in the Initial Assessment Areas, a small percentage of the community is likely to place a high value on avoiding the disruption or intrusion. This subset might prefer Alternative 2 because a higher cleanup goal would mean less time to complete the removal actions at a given property and in a portion of the community, which would minimize disruption. Alternative 2 is less disruptive than Alternative 3, because a smaller volume of soil would be excavated.
- State Acceptance – Alternative 2 would be quicker to excavate than Alternative 3; however, more costly in the long-term because of requirements related to waste left in place. DTSC considers this alternative less acceptable because a cleanup goal of 400 ppm would leave in place levels of lead that could potentially present a risk to sensitive individuals, such as young children and pregnant women.

Table 11 – Cost Estimate for Alternative 2 - Lead Hazard Removal and Offsite Disposal

Item	Units	Unit Type	Unit Cost		Cost
Task 1 - Pre-Field					
Initial Preparation Activities	1	LS	$500	-	$500
Permitting	1	LS	$750	-	$750
Soil Analytical and Certification	1	LS	$500	-	$500
Total - Pre-Field					**$1,750**
Task 2 - Mobilization & Project Support					
Mobilization & Site Controls	1	LS	$2,500		$2,500
H&S and Environmental/Dust Controls	1	LS	$1,500	-	$1,500
Total - Mobilization & Project Support					**$4,000**
Task 2 - Excavation Activities					
Excavation and handling of soil	59	tons	$110	$/ton	$6,490
T&D - Non-RCRA	44.25	tons	$85.00	$/ton	$3,761
T&D - Non-Haz	14.75	tons	$45.00	$/ton	$664
Total - Excavation Activities					**$10,915**
Task 3 - Backfill Materials					
Clean Fill Sand/Soil	49	tons	$100	$/ton	$4,900
Topsoil	10	tons	$120	$/ton	$1,200
Total - Backfill Materials					**$6,100**
Task 4 - Restoration Activities					
Crushed Granite/Rock	100	SY	$20	$/SY	$2,000
Sod/Turf Placement	100	SY	$15.00	$/SY	$1,500
Mulch Placement	20	SY	$25.00	$/SY	$500
Total - Restoration Activities					**$4,000**
Task 5 - 3-Month Warranty Period					
Rework - Repair deficiencies	1	LS	$1,000	-	$1,000
Total - 3-Month Warranty Period					**$1,000**
Task 6 - Demobilization and Project Closeout					
Demob and close out	1	LS	$1,000	-	$1,000
Total - Demobilization and Project Closeout					**$1,000**
Task 7 - Property Owner Compensation					
Temporary Relocation	1	each	$1,000	$/owner	$1,000
HEPA Vacuuming/Interior Cleaning	0.5	each	$3,000	$/owner	$1,500
Landscape Compensation	1	each	$500	$/owner	$500
Total - Property Owner Compensation					**$3,000**
Task 8 - Project Oversight & XRF Confirmatory Sampling					
Project Oversight	1	LS	$2,500		$2,500
Total - Project Oversight & XRF Sampling					**$2,500**
Task 9 - Operations & Maintenance					
O&M	30	annual cost	$471	$/year	$14,143
Total - Operations & Maintenance					**$14,143**
Total Cost Per Residential Property					**$48,408**
Fee	**10%**				$4,841
					$53,249
Contingency	**10%**				$5,325
Subtotal Cost Per Residential Property					**$58,574**
NOTES: **NCP RANGE (30%to +50%):**		**$76,146**	**$87,861**		
-25/75 split of non-hazardous and non-RCRA hazardous					
-T&D = transportation and disposal					
-Excavation to maximum 18 inches bgs					
-Assume half of property owners request HEPA Vacuum/Interior Cleaning, approximate cost per property is $3,000.					

5.3.3 ALTERNATIVE 3 – RISK-BASED REMOVAL AND OFFSITE DISPOSAL

The *Risk-Based Removal Alternative* (Alternative 3) involves the excavation and offsite disposal of lead in soil until post remediation lead concentrations are below a representative soil lead concentration of 80 ppm for properties within the PIA. Soil would be excavated to a maximum depth of 18 inches bgs. Properties with residual concentrations of lead above the representative soil lead concentration of 80 ppm at depths greater than 18 inches would require further evaluation. Excavation and offsite disposal would be an effective means of removing lead from sensitive land use properties and meet the cleanup objectives.

An evaluation of this alternative with respect to the three various sets of NCP criteria is presented below.

Threshold Criteria

- Overall Protection of Human Health and the Environment – Alternative 3 would meet the cleanup objectives and is highly protective of human health and the environment.
- Compliance with ARARs – Alternative 3 could be conducted in accordance with all federal and state ARARs.

Balancing Criteria

- Long-Term Effectiveness – Alternative 3 would reduce the concentrations of lead in remediated properties within the PIA to levels that no longer present a threat to human health or the environment, thereby eliminating the long-term risk of exposure.
- Reduction in Toxicity, Mobility, or Volume – Although contamination would be removed from the residences, excavation and offsite disposal do not result in the reduction of toxicity or volume of contaminants from an offsite perspective, because the lead in soil is merely moved from one location to another. However, by placing soil with elevated concentrations of lead in an engineered landfill suitable for receiving the concentrations of lead detected, the mobility would be reduced. This alternative could potentially be combined with other post-excavation treatment to reduce waste generated.
- Short-Term Effectiveness – Potential short-term risks to onsite workers, public health, and the environment could result from dust or particulates that may be generated during soil excavation and handling. These risks could be mitigated using PPE for onsite workers and engineering controls, such as dust suppression and additional vehicle and equipment operation safety procedures, for protection of the surrounding community. The short-term risks are viewed as low to moderate. However, dust monitoring would be conducted to confirm that dust mitigation measures are adequate.
- Implementability – Alternative 3 is technologically feasible, and readily implementable. This alternative relies on common proven technology, uses readily available equipment and labor, and requires minimal permitting.
- Cost – Alternative 3 costs are driven primarily by the costs associated with soil excavation, transport, and offsite disposal. These costs depend on the method of excavation, the excavated volume, and the waste classification of the excavated soil, which in turn determines the costs of

transportation and disposal. A cost analysis based on standard industry practices and assumptions is included in Table 12 below. The cost analysis at this stage of the cleanup is preliminary and is assumed to be within +50 to -30 percent of the actual cleanup costs.

Modifying Criteria

- Community Acceptance – Alternative 3 is likely to be perceived by the community as acceptable was acceptable to the community, because it would mitigate the identified hazards and risks associated with lead in soil and render the properties safe for continued inhabitance with only moderate disruption during implementation.
- State Acceptance – Alternative 3 would be viewed favorably by regulatory agencies, because itis permanent and protective of human health and the environment. Alternative 3 would not limit future development of the properties, require restrictions on land use, nor require continued O&M. Alternative 3 would take longer to complete excavation for the average property; however, cleanup would be achieved earlier than Alternative 2 because waste is left in place. In balance, this alternative would be viewed as more acceptable to the state.

5.4 DESCRIPTION OF PREFERRED CLEANUP ALTERNATIVE

Alternative 3, *Risk-Based Removal and Offsite Disposal*, is the selected alternative to remediate properties within the PIA. Alternative 3 assumes that the excavation of lead-impacted soil will prevent residents within the PIA from exposure to elevated levels of lead in soil above 80 ppm. A Post-Cleanup Evaluation for lead in accordance with PT&R Guidance, Appendix I, will be performed to verify that the target cleanup goal was achieved for properties that are cleaned up pursuant to this Cleanup Plan. If the post-cleanup lead concentrations exceed the target cleanup goal, properties will be further evaluated on a case-by-case basis to determine if spot removal or other ICs will be required.

The Cleanup Plan will be implemented through the development of site-specific design plans that will address local permit requirements, ARARs, Project Design Feature and a Mitigation Monitoring and Reporting Program (Appendix L). These are intended to minimize the amount of soil that will require removal from each property to achieve the target cleanup goal, reduce the environmental impact from soil transportation, and reduce the amount of soil requiring landfill disposal.

Table 12 – Cost Estimate for Alternative 3 - Risk-Based Removal and Offsite Disposal

Item	Units	Unit Type	Unit Cost		Cost
Task 1 - Pre-Field					
Initial Preparation Activities	1	LS	$500	-	$500
Permitting	1	LS	$750	-	$750
Soil Analytical and Certification	1	LS	$500	-	$500
Total - Pre-Field					**$1,750**
Task 2 - Mobilization & Project Support					
Mobilization & Site Controls	1	LS	$2,500		$2,500
H&S and Environmental/Dust Controls	1	LS	$1,500	-	$1,500
Total - Mobilization & Project Support					**$4,000**
Task 2 - Excavation Activities					
Excavation and handling of soil	88	tons	$110	$/ton	$9,680
T&D - Non-RCRA	44	tons	$85.00	$/ton	$3,740
T&D - Non-Haz	44	tons	$45.00	$/ton	$1,980
Total - Excavation Activities					**$15,400**
Task 3 - Backfill Materials					
Clean Fill Sand/Soil	78	tons	$100	$/ton	$7,800
Topsoil	10	tons	$120	$/ton	$1,200
Total - Backfill Materials					**$9,000**
Task 4 - Restoration Activities					
Crushed Granite/Rock	100	SY	$20	$/SY	$2,000
Sod/Turf Placement	100	SY	$15.00	$/SY	$1,500
Mulch Placement	20	SY	$25.00	$/SY	$500
Total - Restoration Activities					**$4,000**
Task 5 - 3-Month Warranty Period					
Rework - Repair deficiencies	1	LS	$1,000	-	$1,000
Total - 3-Month Warranty Period					**$1,000**
Task 6 - Demobilization and Project Closeout					
Demob and close out	1	LS	$1,000	-	$1,000
Total - Demobilization and Project Closeout					**$1,000**
Task 7 - Property Owner Compensation					
Temporary Relocation	1	each	$1,000	$/owner	$1,000
Interior Cleaning	0.5	each	$3,000	$/owner	$1,500
Landscape Compensation	1	each	$500	$/owner	$500
Total - Property Owner Compensation					**$3,000**
Task 8 - Project Oversight & XRF Confirmatory Sampling					
Project Oversight	1	LS	$2,500		$2,500
Total - Project Oversight & XRF Sampling					**$2,500**
Subtotal Cost Per Residential Property					**$41,650**
Fee	**10%**				**$4,165**
					$45,815
Contingency	**10%**				**$4,582**
Subtotal Cost Per Residential Property					**$50,397**
NOTES: **NCP RANGE (-30% to +50%):**		**$35,278**	**$75,595**		
-50/50 split of non-hazardous and non-RCRA hazardous					
-T&D = transportation and disposal					
-Excavation to maximum 18 inches bgs					
-Assume half of property owners request HEPA Vacuum/Interior Cleaning, approximate cost per property is $3,000.					

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5.5 JUSTIFICATION OF PREFERRD CLEANUP ALTERNATIVE

Alternative 3 -- Risk Based Excavation and Offsite Disposal, the selected action, will remove lead-impacted soil to achieve a Post-Cleanup Evaluation with a representative soil lead concentration of 80 ppm or less to eliminate direct exposure and enable continued use of the properties within the PIA. The primary factors that supported the selection of Alternative 3 are:

1. Protective of human health and the environment;
2. Relatively cost effective;
3. Technically feasible;
4. Remedy immediately and permanently reduces residents' exposure to soil lead concentrations greater than a representative soil lead concentration of 80 ppm in accordance with Section 3.4;
5. No long-term monitoring or reporting needed; and
6. Eliminates the potential for contaminants to migrate to adjacent properties.

Alternative 3 meets the Threshold Criteria, i.e., overall protection of human and environment and compliance with ARARs. It meets the Balancing Criteria such as long-term effectiveness; reduction of mobility and volume on-site; short-term effectiveness; and implementability. It is also moderately less expensive than Alternative 2, because it does not include operation and maintenance costs; however, it provides a greater and long-term permanent reduction of health risk by removing additional soil to achieve the Post-Cleanup Evaluation in accordance with DTSC's *PT&R Guidance* for a representative soil lead concentration of 80 ppm or less for lead in soil. Finally, it will meet Modifying Criteria including community and state acceptance.

The implementation of Alternative 3 is presented in Section 6.0 and includes a summary of the property characterization program currently ongoing within the PIA; soil cleanup procedures including excavation, offsite disposal, transportation, and property restoration; and permitting requirements. In addition, a preliminary implementation schedule is presented in Section 7.0.

5.6 PRELIMINARY CLEANUP DESIGN PROCESS

The *Risk-Based Removal Alternative* (Alternative 3) provides a framework to implement soil removal actions at lead-impacted properties within the PIA. However, each property is unique and a specific *Excavation, Disposal, and Restoration Design Plan* will be developed based on the results of the soil assessment and DTSC's evaluation. A soil excavation plan will be developed for each property. Figures 12, 13, and 14 illustrate typical soil excavation plans in plan-view and cross-section for a residence, school, and park; respectively. Soil excavation plans for day care centers would be similar to the residential plan (Figure 12) and plans for child care facilities would be simarlar to the school plan (Figure 13).

Implementation of the soil removal action at each property will consist of a series of separate tasks as identified in Appendix D of DTSC's *PT&R Guidance*. The tasks include:

- Selecting excavation locations;
- Permits, notifications and site preparation;
- Excavation methodology;
- Environmental control measures;
- Air monitoring during excavation; and
- Field variances.

The overall implementation process for a soil removal action at an individual property is presented in more detail in Section 6.0.

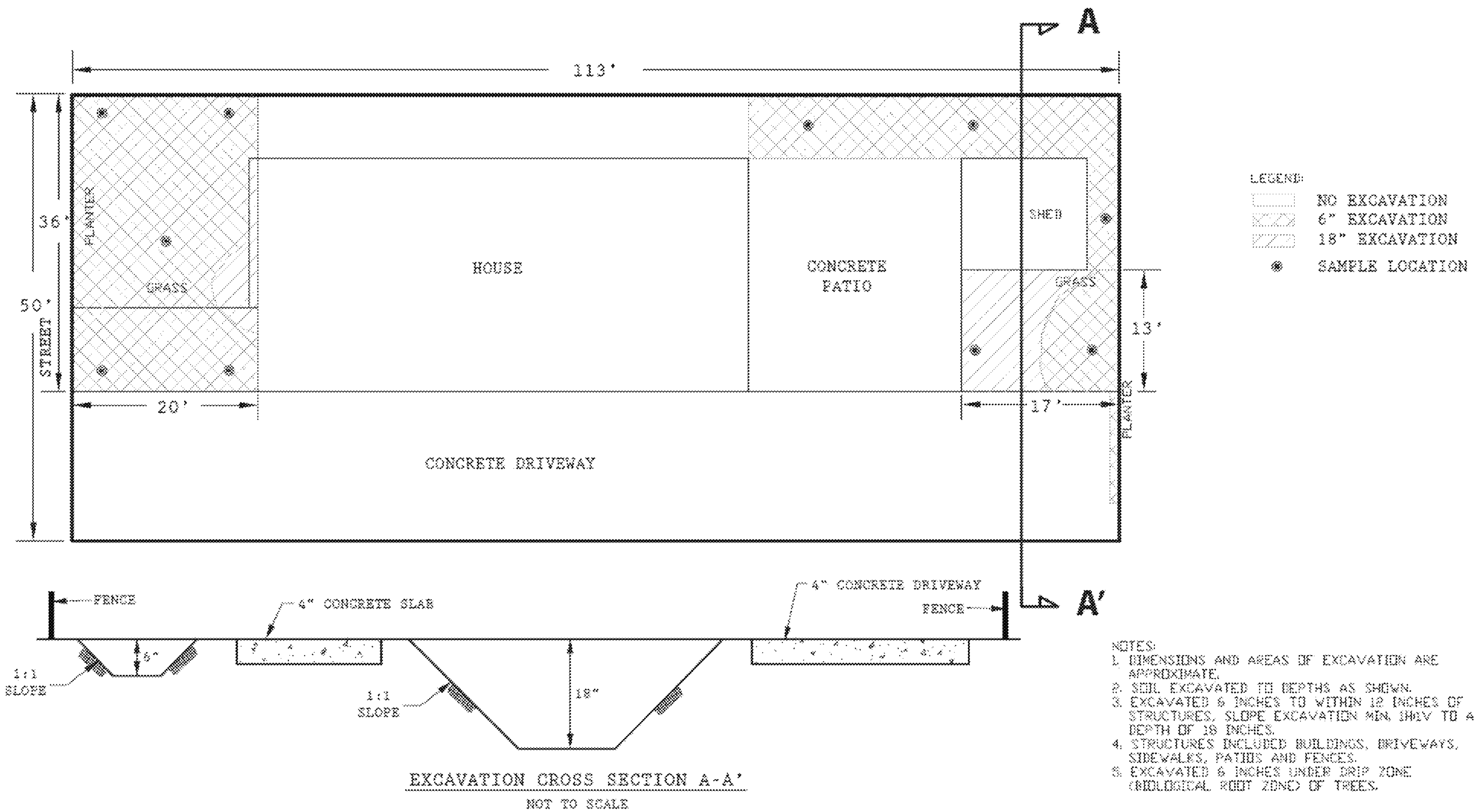

Figure 13 – Typical Residential Excavation Plan

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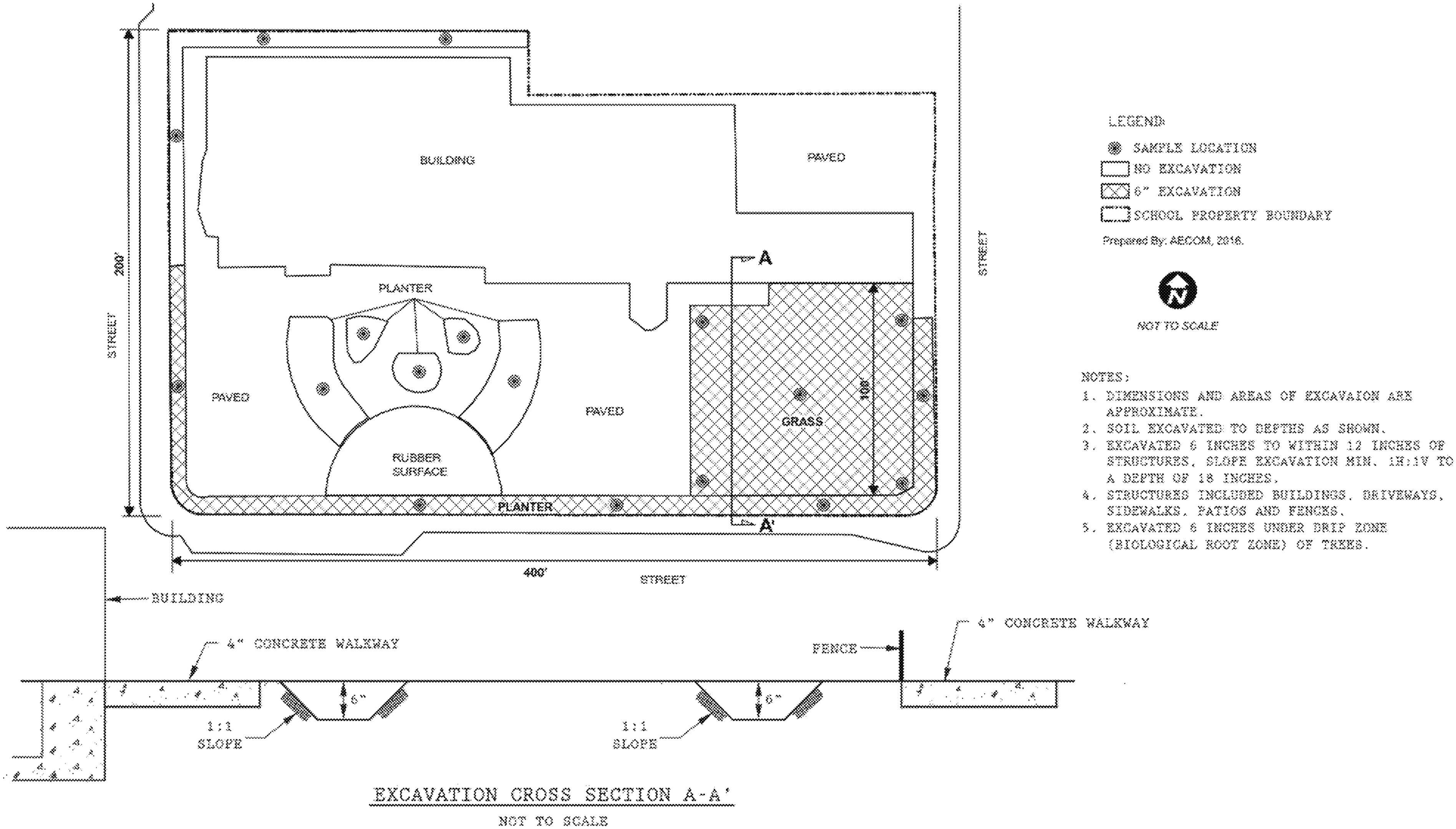

Figure 14 – Typical School Excavation Plan

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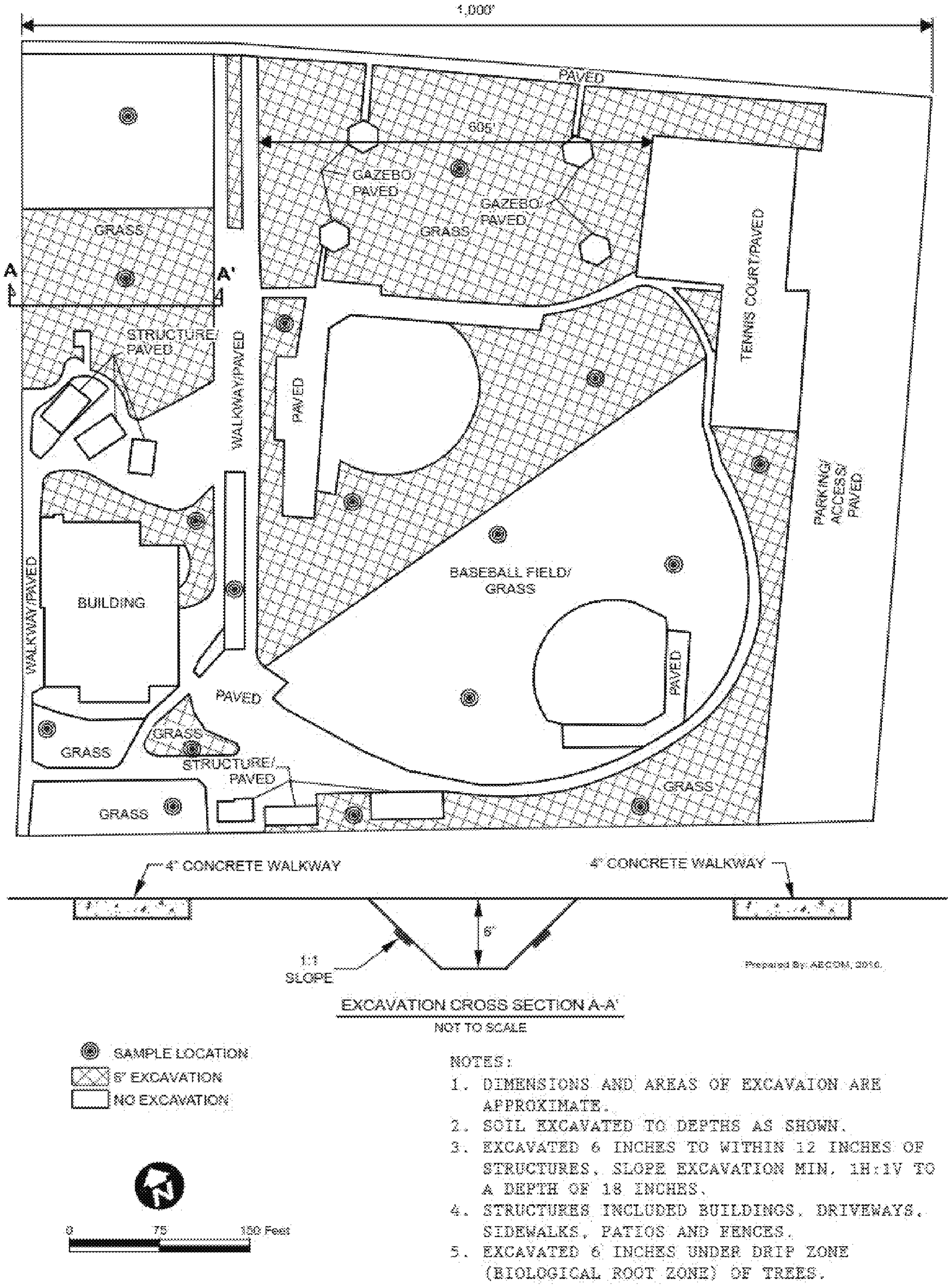

Figure 15 – Typical Park Excavation Plan

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6.0 IMPLEMENTATION PROCESS & DOCUMENTATION

This Cleanup Plan will be implemented based on property-specific design plans that will address the substantive requirements in the ARARs. The design plans for implementing the selected cleanup alternative will be prepared in accordance with DTSC's *PT&R Guidance*. This cleanup plan will be implemented based on property-specific excavation, disposal, and restoration plans (Design Plan). A *Transportation Plan*[36] for offsite disposal and backfill import soils, and a *Confirmation Sampling Plan,* including requirements for a Post-Cleanup Evaluation for lead will also be prepared. A property-specific Health and Safety Plan, consistent with the Project Safety, Health and Environmental Plan, contained in Appendix E, will be prepared if site conditions warrant modifications. The technical plans will contain the specific engineering design details of the proposed cleanup approach at each property, as necessary. The Design Plans will include the design criteria and final plans and specifications for the property, as well as a description of any equipment to be used to excavate, handle, and transport lead-impacted soil. Field sampling and analysis plans that address sampling during implementation and soil confirmation sampling to assess achievement of the cleanup objectives will also be included.

The removal activities consist of excavating, loading, transporting, and disposing of the soil from properties with lead above representative soil lead concentration of 80 ppm. After the removal action at each property, the property will be restored. Cleanup activities would occur in the following three stages and are detailed in the subsequent section:

- Pre-excavation activities;
- Excavation and management of soil; and
- Property restoration.

6.1 PRE-EXCAVATION ACTIVITIES

Prior to the start of removal activities on a property, representatives from DTSC and its contractor will meet with each property owner and, as appropriate, resident to describe the planned activities to be performed on the property. Topics to be discussed will include the following

- Protection of property and yard fixtures;
- Determination of occupants;
- Preference for installation of landscape material; and
- Relocation needs.

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[36] Appendix P, Transportation Plan for the Removal Action Plan (Cleanup Plan) presents the measures and information that will be taken into account to minimize the potential health, safety, and environmental risks associated with the off-site transportation of wastes generated during the cleanup. Juridisction-specific Traffic Management Plans will also be prepared to consider local traffic impacts.

Materials detailing the work being conducted will be provided, as will 24-hour toll free, bilingual, contact numbers for any questions or concerns that may arise while work is being planned, performed, and completed on the property.

6.1.1 PERMIT, DOCUMENTATION, AND NOTIFICATIONS

All cleanup activities will be conducted in accordance with applicable local, state, and federal regulations. The applicable permits will be obtained and timely notifications made to ensure timely implementation of the work. The following permits, documentation, and notifications will be secured, evaluated, and documented for the administrative record for each property:

- Authentication of Owner-signed access agreements;
- Identification and documentation of the presence or absence of air ducts;
- Notification to residents for excavation activities;
- Notification to Underground Service Alert for utility clearance within excavation areas;
- Permits for excavation, shoring, and grading, if needed;
- CDPH Abatement of Lead Hazards Evaluation Notification Form 8551 and Lead Hazard Evaluation Report Form 8552 or latest versions;
- Encroachment permits for work activities, if needed;
- Greenhouse gas emissions reduction plan;
- Transportation Plan and Jurisdiction-Specific Traffic Management Plan;
- Noise barrier plan; and
- Lane Closure (traffic control), if necessary.

The preliminary stages of mobilization will consist of the following tasks associated with preparing for the cleanup action.

- Establish air monitoring locations;
- Outline the removal limits at each property and identify implementing controls associated with the following as described in the *Design Plan* prepared for each property:
  - Erosion control;
  - Water management;
  - Excavation area safety/security;
  - Protection of existing structures; and
  - Restoration.
- The cleanup contractor will mobilize necessary equipment and supplies to the property and prepare for cleanup. The contractor will conduct work between 7:00 am to 4:00 pm, Monday through Friday, unless otherwise arranged by DTSC and the property owner.

6.1.2 PROPERTY PHOTO DOCUMENTATION

Before soil is removed from the identified properties, prior to cleanup activities the property will be documented with photographs and, at the discretion of the cleanup contractor, video logged. The photographs will document the existing condition of the properties and will document the condition of the proposed work area and adjacent structures prior to work activities. Photographs and/or videos will be taken with a digital camera and will be correlated to a map that displays the position and direction from which each photograph was taken. Photographs will also be taken after restoration has been completed.

6.1.3 UTILITIES

At least 48 hours prior to field work, DTSC's contractors will contact Underground Service Alert to identify all proximal underground utilities so that each utility will be conspicuously marked. Areas within approximately six (6) inches of underground utilities will not be disturbed to prevent damage to the appurtenances.

6.1.4 SITE PREPARATION AND CONTROL MEASURES

Prior to the start of cleanup activities on a property, DTSC representatives and contractors will meet with the property owner (and resident, with property owner approval) to describe the soil sampling results that were previously provided to the resident and property owner, as well as the cleanup activities proposed to be performed on the property. Topics to be discussed will include, but are not limited to, protection of property and yard fixtures, identification of the home occupants (including pets and service animals), temporary relocation options, landscaping compensation, and property restoration—including identification and measurement of plantable area. After this initial meeting, residents will likely meet or speak on the phone more than once with various contractors prior to the start of cleanup activities to discuss details such as the cleanup schedule, start date for cleanup activities, and final restoration of the property.

6.1.5 EXCAVATION AREA SAFETY AND SECURITY

During all property preparation, removal, and restoration activities, procedures will be implemented to ensure site safety, security, and control to protect residents from exposure and existing property features from damage. These procedures will include safe working distances, warning tape, manual digging, and temporary fencing and barriers. Prior to initiating excavation activities, Underground Service Alert will be notified at least 48 hours prior in accordance with the Division of Occupational Safety and Health's (Cal/OSHA's) Construction Safety Orders – Excavations.

Access to the areas to be remediated may require an encroachment permit (blocking sidewalk access) or traffic control permit (lane closures) from the jurisdiction (city or county) in which the work will be conducted.

During the cleanup work, property entry and exit will be controlled through the creation of work zones. An exclusion zone, contamination reduction zone (decontamination zone), and support zones, as well as the staging area (collectively known as the work zones), will be established within the area in which cleanup activities will occur. During all cleanup activities, site access will be restricted to authorized personnel only. During non-working hours, access will be controlled via secured temporary fencing (rigidly-erected orange safety fencing or temporary chain link fence) that will be placed, as needed, along the edges of excavation to restrict access to the excavation areas. The work area will be kept clean of any contractor generated waste material. All contractor-generated waste material will be consolidated and removed from each property daily. Contractor-generated waste will not be disposed off in solid waste containers at the property.

Excavation operations and activities will stay a minimum of six (6) inches away from gas and water lines that feed the property from the street. Therefore, these lines will not be exposed. This will minimize the potential impact to these utilities as well as potential associated repairs to these lines. If these lines are accidentally damaged, they will be repaired by the cleanup contractor.

At the daily completion of work, and as necessary during the course of work, driveways and sidewalks on the property will be cleaned using HEPA-certified vacuums. If wet cleanup is necessary (e.g., power spray), the water will be collected in a manner that prevents sediment from entering storm water inlets or other structures.

If the remediation team causes any damage to public or private utilities within the properties being remediated, the damage will be addressed at no expense to the property owner.

The contractor will:

- Install temporary fencing around the excavation boundary within the area of excavation;
- Identify and clearly delineate the work zones, including the exclusion, decontamination, and support zones. The exclusion zone will include all areas of excavation, the impacted soil staging area, and the truck loading area. The decontamination zone will be located immediately adjacent to the exclusion zone to decontaminate personnel, equipment, and vehicles as they exit the exclusion zone. The support zone will be located within the designated work area, but it will be outside the exclusion and decontamination zone. The support zone will be used to temporarily store equipment, vehicles, and clean soil, as well as to accommodate cleanup personnel.

6.1.6 PUBLIC PARTICIPATION

DTSC will provide work notices to the surrounding community and provide on-site workers with community outreach and cultural sensitivity training. The residents may remain on the property during the cleanup or, although not necessary, relocate during the cleanup. DTSC will offer temporary relocation assistance to residents who choose to relocate and compensation for eligible temporary relocation expenses incurred during soil excavation and removal activities. Detailed information about compensation and temporary relocation during soil excavation and removal activities, including options, payment procedures, and other specifics will be included in DTSC's temporary relocation and compensation guidelines.[37]

During cleanup, a sign will be placed at the front of the property that will display appropriate contact information and a toll-free hotline for additional information. From 8:00 a.m. to 5:00 p.m., the hotline will be answered by a bilingual representative who will collect caller information and forward the inquiry to the appropriate DTSC representative. During non-business hours, calls to the hotline will be directed to voicemail, which is checked daily during normal business hours. In the event of an emergency, residents, the hotline staff, or a contractor may call the Office of Emergency Services at (800) 852-7550.

6.2 EXCAVATION ACTIVITIES

Lead-impacted soil will be excavated and removed from the properties identified for cleanup within the PIA. Where feasible, properties adjacent to one another or within the same block that are identified for cleanup will be clustered—cleaned up simultaneously or sequentially. Clustering minimizes disruption to residents and limits impacts from cleanup activities in any single area. Clustering also allows for more efficient and expeditious cleanups because cleanup crews will be mobilized only one time for a single area, rather than multiple times. This also results in a more cost-effective cleanup process.

6.2.1 EXCAVATION LIMITS

Areas will typically be excavated to a maximum depth of 18 inches bgs. The removal areas will be based on the concentrations of lead found in the soils and the accessibility of such soils for removal identified in the Design Plan. Soil removal depths will range from six (6) inches to 18 inches bgs.

As necessary, hand excavation will be conducted close to existing structures, utilities, mature trees, or other areas that would be difficult to excavate around or that could be damaged by equipment. Soil will not be removed beneath or inside structures, roads, sidewalks, brick patios, driveways, or other inaccessible or permanent features. Excavations adjacent to houses, garages, outbuildings, driveways, sidewalks, structural perimeter walls and fences and patios will be benched in six (6)-inch layers to the full removal depth, as necessary. No soil removal activities will occur under decks or other areas inaccessible by residents. If a planter is not structurally sound, the planter will be removed with concurrence of the property owner. Small shrubs and other plantings (excluding trees and mature shrubs) will be removed and disposed offsite with property owner concurrence.

[37] Guidelines on temporary relocation and compensation will be issued separately by DTSC, and may be subject to change as DTSC implements the Cleanup Plan.

6.2.2 SITE CLEARING AND DEBRIS REMOVAL

Established trees and will not be removed. Small shrubs and other plantings less than four (4) feet in height (excluding trees and established shrubs) will be removed and disposed offsite with the property owner's concurrence. Areas within the biological root zone of trees or established shrubs will be excavated to a maximum depth of six (6) inches in order to preserve the integrity and survivability of the trees and shrubs. DTSC will measure pre-existing planted areas prior to soil excavation to determine the appropriate compensation for replacement landscaping.

6.2.3 EQUIPMENT

Excavations will be conducted using small construction equipment or hand tools. In addition, at the end of the workday, and as necessary during the course of work, driveways and sidewalks on the property will be cleaned using a high-efficiency particulate air (HEPA)-certified vacuum. If wet cleanup is necessary (e.g., power spray), the water will be contained on plastic sheeting, collected, and sent to a water treatment facility to prevent sediment from entering storm water inlets or other structures; alternatively, the water will be used for dust suppression on lead-impacted soil or other waste that will be hauled off site for disposal. Potential equipment to be used is listed below:

- Compact excavators and compact loaders for excavation and loading;
- A walk-behind compactor for soil compaction;
- A water buffalo or water from the residence for dust suppression and soil compaction efforts;
- A street sweeper attachment (with a filter to be changes out when necessary) for the compact excavator/loader to keep the cleanup area and access roads clean;
- A HEPA vacuum for use during and post-remediation cleanup activities;
- Trucks for exporting impacted soil (appropriately secured to eliminate dust), and importing clean backfill soil;
- Other hand-held equipment based on occasional field needs for areas not accessible by equipment; and
- Instrumentation for monitoring.

At the completion of the workday, construction equipment will typically be parked on the property, although, on occasion, it may be parked on a public street.

6.2.4 SHORING AND SETBACKS

Excavations against houses, garages, outbuildings, driveways, sidewalks, structural perimeter walls and fences, and patios will be hand dug to six (6) inches and benched at six (6)-inch increments with a 1:1 slope to the excavation depth to maintain the integrity of the soil under these structures.

6.2.5 EXCAVATION PROCEDURES AND PROGRESSION

Each area of concern will be excavated to the proposed excavation depth and extent identified in the property specific design plans. Excavation will continue until a representative soil lead concentration of

80 ppm or less is achieved as determined through confirmation sampling and the Post-Cleanup Evaluation for lead. See Section 6.8 for more information about Post-Excavation Sampling.

Soil will be excavated, as appropriate, with mini or compact excavators and hand held tools and moved to established soil stockpile or loading areas within the exclusion zone. The exclusion zone may shift as the work and excavation progresses. Stockpiles will be maintained in areas that minimize access inconveniences to residences. Soils will be managed for dust control as necessary based on air monitoring measurements and physical conditions. If wetting is insufficient for dust control, soil may be covered.

As necessary, hand excavation will be conducted close to existing structures, utilities, mature trees, or other areas that are difficult to excavate around or that could be damaged by equipment. Soil will not be removed beneath or inside structures, roads, sidewalks, brick patios, driveways, or other inaccessible or permanent features. Excavations adjacent to houses, garages, outbuildings, driveways, sidewalks, structural perimeter walls and fences and patios will be benched in 6-inch layers to the full removal depth, as necessary. No soil removal activities will occur under decks or other areas not readily accessible by residents. If a planter is not structurally sound, the planter may be removed with concurrence of the property owner. Small shrubs and other plantings (excluding trees and mature shrubs) will be removed and disposed offsite with property owner concurrence.

Loaded trucks will move to the truck decontamination station where soil will be removed from fenders and tires and the bed will be covered. Each loaded truck will leave the site with a completed manifest or bill of lading for transport of soil or other material to the disposal location. Soil loading and off-haul routes are designated in the Transportation Plan (Appendix P).

Excavation and removal will be performed by a California-licensed hazardous substances removal contractor. All lead abatement and lead hazard assessment work for public and residential buildings will be conducted in accordance with Title 17 of the California Code of Regulations. Personnel on site will observe Cal/OSHA safety standards and follow a DTSC-approved Health and Safety Plan or the *Project Safety, Health and Environmental Plan* contained in Appendix E, which addresses the safety of personnel entering excavations for the purposes of surveying and operating equipment.

6.2.6 SURVEYING ACTIVITIES

Surveying will include pre-excavation survey to document the property grade prior to excavation, excavation limits, confirmation sample locations, and post-excavation survey to document the final property grade. The property will be surveyed multiple times during the removal action. All surveying activities will be performed under the direction of a California-licensed surveyor or qualified civil engineer. The coordinate system used by Los Angeles County will be used for the cleanup. Survey data will be recorded and documented in the Letter of Completion (Section 11.0).

6.3 DUST CONTROL AND SUPPRESSION

Dust control measures will be implemented during excavation and soil-moving activities as required by the *Project Safety, Health and Environmental Plan* (Appendix E).

6.3.1 DUST CONTROL

The largest potential source of dust and emissions during the work will be the excavation and handling of waste during soil removal. Excavation equipment will be stored so that it does not generate fugitive dust immediately after completion of work. Dry decontamination techniques will be used on transport trucks and HEPA vacuuming will be used as needed. Immediately after completion of the work and prior to exiting the property, excavation equipment will be decontaminated by wet wash or by a HEPA vacuum equipped with a filter rated by the manufacturer to achieve 99.97 percent capture efficiency for 0.3-micron particles.

To comply with the SCAQMD rules and *the Project Safety, Health and Environment Plan* (included in Appendix E), dust control measures will be implemented during remediation activities. The planned excavation areas are expected to require simple control measures to mitigate fugitive dust. The following dust control measures will be used, as deemed necessary:

- Spray of water;
- Spray of water amended with environmentally safe additives (e.g., Simple Green, Envirotech Vapor Suppression, or equivalent);
- Application of chemical foams; and
- Coverage of potential lead-impacted dust sources with plastic sheeting or cleansoil.

Onsite monitoring of dust levels is planned as required by *the Project Safety, Health and Environment Plan*. Special considerations will be applied during earth-moving operations (excavation, lead-impacted soil loading, and unloading of clean soil). Dust monitoring will be conducted with dust meters (i.e., Dust Trak model 8530 or model 8532 dust meters or equivalent) as a means of documenting concentrations of airborne dust. Dust readings will be recorded on property-specific dust monitoring forms or in the field logbook. Dust levels will also be monitored during excavation and loading activities at the property perimeters.

If the monitoring data at the perimeters indicates that dust levels are beyond the SCAQMD Rule 403 (Fugitive Dust) limit of 50 micrograms per cubic meter ($\mu g/m^3$) of PM10 (particulate matter with diameter of 10 microns or less) when determined by simultaneous sampling, as the difference between upwind and downwind samples collected, additional engineering control measures listed in Section 6.3.2 will be implemented to reduce the dust levels. If stockpiles of lead-impacted soil or surface excavations are left overnight, the exposed portion will be covered with plastic to reduce dust emissions. If necessary, the tires of soil transport trucks will be washed in order to prevent tracking of soil that will increase fugitive dust levels outside the property perimeters.

6.3.2 DUST SUPRESSION TECHNIQUES

A rule of "no visible dust" will be applied to all aspects of the work that involve impacted soils and fill placement. To control the possible generation and migration of dust during the excavation and handling of soil, the following procedures will be implemented:

- Apply water directly to the active excavation area prior to soil disturbance. Also apply water during the truck loading operations and, asappropriate, promptly apply water to excavation, loading, or unloading operations upon any observance of dust;
- Control dust during operation of trucks by not allowing soil to be dropped from heights above the top rail of the truck body;
- On days when wind speeds exceed 20 mph, cease work and immediately secure or cover excavation areas and soils in a manner that does not generate fugitive lead dust;
- Regularly inspect all rear gate seals and locking mechanisms on waste transport vehicles in order to prevent spillage and dust production;
- HEPA-vacuum the trucks before they leave the loading areas to prevent the deposition of soil, as needed;
- Clean up all spilled soil within the loading area and work areas. Following each day's construction activities; the contractor will HEPA-vacuum all areas to remove any residual soils from non-excavation areas; and
- To prevent leaking, use polyethylene sheeting to line all transport vehicles used for offsite transport of waste. Place sufficient sheeting material in the transport vehicle to allow the contractor to cover and wrap the waste within the vehicle. The contractor will install secured, strapped-down covers to prevent fugitive lead dust during transport to the disposal facility.

Air monitoring will be conducted as described in Section 6.4.

6.4 AIR MONITORING PLAN

Air monitoring will be performed during soil removal and placement activities to ensure that there is no fugitive dust from the impacted soils or fill materials. Real-time particulate monitors and personal air monitors (PAMs) will be used during the operations as detailed in the subsequent sections.

6.4.1 REAL-TIME PARTICULATE MONITORS

Particulate dust monitors measure the total dust in the air. Three particulate dust monitors will be set up daily at each property:

- One monitor will be placed downwind of the excavation area to monitor the effects of the work;
- One monitor will be placed upwind of the excavation to monitor dust coming from sources unrelated to the work; and

- A third monitor will be placed at the property's closest entryway to excavation to identify particulates near the work area.

The contractor will use Dust Trak model 8530 or model 8532 (or equivalent) to measure total suspended particles (TSP) in the air. These monitors measure aerosol particulates corresponding to particulate matter up to 10 microns in diameter (PM10).

Monitors will be placed each day prior to soil disturbance or placement activities, and the levels relative to the area-specific action level will be reviewed hourly during the work. The action level will be the SCAQMD's standard for PM10, which is 50 $\mu g/m^3$ of PM10 when determined by simultaneous sampling, as the difference between upwind and downwind samples collected. This concentration will be greater than the upwind monitor reading that measures the ambient (i.e., non- work-related) conditions. If the downwind or entryway monitor shows a level exceeding the action level, the upwind monitor will be checked to see if there is an upwind source for the increased dust level. The monitor will be checked again in 10 minutes to determine whether the level has dropped below the action level. If it has not, work will be decreased and the dust suppression techniques will be correspondingly increased as needed to lower the dust levels below the action level. Although dust monitoring will not be conducted during a significant rain event, dust meters will be protected in place in the event of a sudden shower.

6.4.2 PERSONAL AIR MONITORS

In addition to the three dust monitors described above, during disturbance of lead-impacted soils, a Gilian GilAir-5 model (or comparable) personal air monitoring (PAM) will be co-located with a dust monitor at each location during the excavation work. The PAM cassettes will be analyzed for lead content at an offsite laboratory after completion of the excavation work. The findings will be reviewed and documented. The date, start time, end time, and air flow will be recorded on the cassette for analysis.

6.5 WASTE MANAGEMENT

It is assumed that the average property will have an excavation area of 1,214 square feet with various excavation depths of 0.5, 1.0, or 1.5 feet bgs, generating approximately 23 to 67 cubic yards of soil. The depth is dependent on the confirmation soil sampling results. Using an average density of 1.3 tons per cubic yard, an estimated 29 to 88 tons of soil could be excavated from each property. Refer to Table 9, *Volume and Weight of Soil Removal Based on Excavation Depths*, for an estimate of the volume and weight of soil excavated. The soil excavated will be managed as outlined in the subsequent sections.

After removal of soil from the initial excavation limits, the status of the excavation will be screened using XRF. If the XRF screening indicates that soil sampling results are higher than the target cleanup goal of 80 ppm as calculated with a 95 percent upper confidence level (UCL) using EPA's ProUCL software, further excavation will occur until subsequent XRF screening indicate that the target cleanup goal has been achieved or a maximum excavation depth of 18 inches bgs is achieved. Confirmation samples will then be collected and submitted to an off-site laboratory for analysis in accordance with the Soil Confirmation Sampling Plan to confirm the target cleanup goal has been achieved. Pre-excavation confirmation samples may be collected to expedite the remediation process.

Based on the XRF results the soil will be characterized for disposal prior to excavation and the disposal facility will be identified. DTSC will be notified before the soil is transported to the disposal facility.

All wastes generated during cleanup activities will be transported to facilities that are operating under appropriate permits and in accordance with applicable regulations. DTSC's contractors will select an appropriate facility based on permitting requirements, waste characterization, and environmental considerations. The treatment, storage, and disposal facility (TSDF) for the soil will be one or more of the following:

- Chiquita Canyon Landfill in the northwestern part of Los Angeles County;
- Simi Valley Landfill in eastern Ventura County.
- La Paz Landfill in southwest Arizona;
- South Yuma Landfill in southwest Arizona.
- Kettleman Hills Landfill in Kings County (San Joaquin Valley).

All non-RCRA and RCRA hazardous waste will be transported under a Uniform Hazardous Waste Manifest. All nonhazardous waste will be transported under a Bill of Lading or Nonhazardous Waste Manifest.

After loading and decontamination, trucks will travel on the approved streets identified in the Transportation Plan in Appendix P and the jurisdiction-specific Traffic Management Plans. All necessary precautions will be taken to prevent track-out from trucks. Trucks will be labeled during transport activities so that they are distinguishable from other trucks in the area.

The vehicles will undergo dry decontamination (e.g., shovels to remove any fallen soil and brushes to loosen caked-on soil, followed by HEPA vacuuming, if necessary). Following the transporter's departure, residual soils will be removed from the decontamination area using the techniques described in Section 6.1.9. In addition, all loading operations will be conducted atop plastic sheeting to avoid the potential spread of impacted waste.

6.6 EROSION AND RUNOFF CONTROL

Erosion control measures will be implemented to control incidental run-off from the excavation areas. If remediation activities occur during the rainy season, California Storm Water Best Management Practices (BMPs, e.g., sand bags, gravel bags, fiber rolls, filter fabric, etc.) in accordance with the California State Water Resources Control Board will be required around the excavation area to prevent run-off from and run-on into the excavation area. The Engineer/Contractor is responsible for implementing these measures on a daily basis and evaluating for proper functionality on a daily basis during remediation activities. In addition, control devices will be required at storm drain inlets located at curbside (including a combination of filter fabric and gravel bags) in case of rain. Proposed erosion control devices will be reviewed and approved by DTSC prior to beginning cleanup activities at each property.

To the extent possible, excavation will be scheduled outside of the rainy season. Surface water run-off and erosion control measures will minimize the water entering the excavation. However in the event water does enter the excavation, water storage capacity will be available on site in a tank to store water pumped from the excavation. Water stored in this tank will be sampled and analyzed prior to disposal at an appropriately permitted disposal facility.

6.6.1 EROSION CONTROL

The erosion control activities implemented during remediation are to prevent surface runoff from entering or exiting the work area. Note that coverage under the state's National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities and an associated Storm Water Pollution Prevention Plan (SWPPP) will not be required by the State Water Resources Control Board for the implementation of the Cleanup Plan except for areas of contiguous disturbance is more than 1 acre.

If removal activities extend into the rainy season, waterproof covers will be placed over storm drains for temporary protection. Berms will be placed around the excavation area (i.e., sand bags) to prevent run-off from and run-on into the excavation area, thereby minimizing the amount of impacted wastewater to be handled. These measures will be evaluated daily during active remediation activities to ensure that they function properly. To prevent sediment from leaving the work area during soil-disturbing activities, multiple erosion control BMPs will be used.

These BMPs may include hay bales and silt socks/fences for the perimeter of the property, as needed. In addition, inlet control devices (including a combination of filter fabric and sandbags) will be used in case of rain. Proposed erosion control devices will be subject to review and approval by DTSC.

The following storm water pollution prevention procedures also will be used:

- Monitor the weather forecast very closely. When rain is forecast, halt cleanup activities;
- Conduct the excavation in small sections so that, if rain begins to fall, the exposed excavation can be covered immediately to keep water out of the excavation;
- Use proper procedures to ensure that wet soil (mud) is not tracked offsite on the tires of trucks used for soil transportation. The procedure may include placing plastic sheeting at the loading area;
- Use plastic sheeting extensively to ensure that the area of excavation is protected from rain during off hours and during sudden heavy rain. Manage wastewater in accordance with the procedures described below; and
- Irrigation systems will not operate during cleanup activities.

In general, except for dust and odor control measures, the excavation will be kept dry to ensure that no wastewater is generated and no environmental concerns arise, and to ensure that the excavation can be backfilled promptly.

6.6.2 WASTEWATER MANAGEMENT

To prevent fugitive dust during construction, the excavation areas will be sprayed with a mist of water prior to soil removal. The amount of applied water will not saturate the soils, and no runoff is expected during this operation. Although they are not anticipated to be needed to prevent offsite migration of soil, silt socks (compost-filled fabric tubes), silt fences, or similar measures will be installed along the perimeter of the excavations in the direction of surface water runoff flow. If necessary during loading, water will be sprayed while the transport vehicle is located in a decontamination area consisting of plastic sheeting and a water collection point.

All water used for loading and decontamination will be captured and transported to an offsite facility licensed to handle this waste for treatment and disposal, or it will be used as dust suppression on soil or other waste that will be hauled offsite for disposal. Following excavation, dry decontamination methods (e.g., shovels to remove any fallen soil or brushes to loosen caked-on soil, followed by HEPA vacuuming) are anticipated to be used on transport trucks and on excavation equipment. No impact to water quality is anticipated.

Water absorption materials will be provided to capture all water and prevent runoff from leaving the property. This runoff includes any leaks in hoses or storm water from a rain event that may occur during site work.

6.7 DECONTAMINATION PROCEDURES

To prevent transfer of contamination off-site or residual contamination from being left onsite by construction equipment and personnel, decontamination procedures consistent with *the Project Safety, Health and Environment Plan*, included in Appendix E will be followed. DTSC's contractors will also develop their own Health and Safety Plan for this cleanup. These procedures are summarized as follows:

- Before excavated waste is loaded into trucks, plastic sheeting will be placed on the ground or asphalt so that spilled waste cannot contact the ground surface. Trucks may be rolled back and forth to allow area property owners access to driveways/streets. In these cases, the plastic will be rolled back to the sidewalk so that the truck tires do not roll over spilled soil and deposit it into the gutter/street. When loading is complete, debris will be placed in the appropriate container for proper disposal, and the plastic sheeting will be folded and disposed daily.
- All equipment wheels/tires will be cleaned over plastic sheeting by means of shovels and stiff-bristled brooms or brushes until they are fully cleaned. When cleaning is complete, debris will be placed in the appropriate container for proper disposal, and the plastic sheeting will be folded and disposed.

- A HEPA- vacuum will be used on hardscape areas where residual impacts may be present following the removal actions. A HEPA vacuum will be used on any spilt soils as necessary.
- PPE will be removed and discarded in the contamination reduction zone. Reusable items such as work boots will be decontaminated using the following two-stage process:
- HEPA vacuum boots, if necessary;
- Wash the items in a detergent solution with a stiff-bristled brush and rinse them with clean water; and
- Distribute the rinse water over contaminated soil (to be exported) for dust control.

The decontamination containers will be clearly marked and will identify the wash and rinse containers to be used. To avoid potential cross contamination, rinse water will only be applied to waste that will be offloaded for disposal; it will not be applied to any of the open excavations.

6.8 CONFIRMATION SAMPLING

Confirmation sampling will be required to achieve the target cleanup goals defined in Section 3.0. To minimize the amount of soil that is excavated and disposed of, pre-excavation sampling will be conducted. Sampling information collected during the characterization phase will be used to establish preliminary excavation boundaries.

The following subsections describe the process that will be used to demonstrate attainment of the removal action goal for lead-impacted soil with concentrations above the target cleanup goal.

6.8.1 SOIL SAMPLE COLLECTION

Pre-excavation confirmation samples will be collected from up to eight (8) locations form the planned excavation depth(s). Typically, soil samples from four (4) boreholes from the front yard and four (4) boreholes from the back yard will be collected. Confirmation soil sampling will occur before the excavation activities are completed and before backfilling and restoration activities begin. The areas requiring cleanup will be screened, using an XRF meter, at 12 and 18 inches below ground surface (bgs) to determine the excavation depths. The confirmation samples will be collected for the excavation depth that achieves the cleanup goals and sent to a laboratory for analysis. The laboratory samples will confirm and establish the boundaries of the excavation before beginning the excavation activities.

6.8.2 SAMPLE DESIGNATION

Each confirmation soil sample will have a unique identification code to indicate where and at what depth a sample was collected. Procedures generally consistent with the sample designations previously used during the assessment of the properties will be used for confirmation samples.

6.9 PROTECTION OF EXISTING STRUCTURES

During all property preparation, removal, and restoration activities, procedures will be implemented to protect existing property features from damage. These procedures will include safe working distances, warning tape, manual digging, and temporary fencing and barriers. At the daily completion of work, and as necessary during the course of work, driveways and sidewalks on the property will be cleaned using HEPA-certified vacuums. If wet cleanup is necessary (e.g., power spray), the water will be collected in a manner that prevents sediment from entering storm water inlets or other structures. If the remediation team causes any damage to public or private utilities within the properties being remediated, the damage will be repaired by the contractor at no expense to the property owner.

The potential intrusion of fugitive dust into the residential structures will be minimized by using the dust suppression techniques discussed above and by requesting that all residence doors, windows and vents be closed before excavation activities begin. Any ground floor windows remaining open when excavation activities are scheduled to begin will be sealed with plastic sheets.. Vents, including window-mounted air conditioner vents, will also be sealed with plastic sheeting before excavation activities begin. Doors, windows, and vents will be inspected periodically throughout the day to ensure they remain closed or to install plastic sheeting as needed. Soil excavation or other work that may generate dust will not begin until these measures are conducted.

If residents do not relocate and the predicted daily maximum air temperature exceeds 80°F while excavation work is taking place, the resident will be offered a fan or ventless air cooling system to use on a temporary basis until the windows can be opened again following excavation work.

6.10 SUPPLEMENTAL ENVIRONMENTAL CONTROLS

Project Design Features (PDFs) and mitigation measures from the EIR will be implemented to avoid and mitigate impacts. PDFs and the mitigation measures are set out in Appendix L. Other environmental controls may be required if unforeseen conditions arise at the property undergoing cleanup. Remediation will be conducted in a very proactive manner in order to identify potential site conditions and develop appropriate engineered measures to mitigate those conditions. If unforeseen conditions are identified, work will be transitioned to another portion of the property where these conditions will not affect the ongoing operations, if possible. Work will be halted if unsafe conditions arise. As necessary, DTSC will coordinate with other state and local agencies for disposal of wastes and stabilization of site conditions other than lead contaminated soil that are encountered.

Although DTSC's authority to address lead-based paint is limited, DTSC is committed to partnering with federal, state and local agencies and affected residents to obtain resources to stabilize or abate lead-based paint hazards.

6.11 TRAFFIC CONTROL

The cleanup contractor will develop a Traffic Management Plan for each jurisdiction in the PIA. To ensure safe and uninterrupted traffic flow, extreme caution will be exercised while the vehicles are being staged and are entering and exiting the work area. Traffic into and out of the area will be planned to optimize traffic flow. The trucks' entry into and exit from the work properties will be facilitated by flagmen (as necessary), with due consideration for the traffic hazards associated with nearby businesses and pedestrian traffic in the remediation area.

Excavated waste will be transported via surface streets per the DTSC-approved Transportation Plan, in Appendix P, directly to the offsite disposal facility. Backfill will also be transported directly to the residential property in accordance with the Transportation Plan in Appendix P.

Construction vehicular traffic will be controlled to ensure that activities are performed safely and efficiently. Site workers will remain cognizant of the nature of this work within residential neighborhoods and will perform work in a safe manner. Speed limits will be established and implemented by signs and flagmen, as necessary, to minimize dust generation and maintain a safe environment for workers and local residents, including children. All trucks hauling excavated or backfill soil will be tarped during transportation.

The Transportation Plan in Appendix P, in combination with the jurisdiction-specific Traffic Management Plans, will describe the specific route(s) proposed for transportation of soils to/from the residential areas. The Transportation Plan requires the following mitigation measures:

- The contracted trucking company hauling the soils to the disposal facility must be licensed in California to transport hazardous waste, if the waste are characterized as such.
- Operator (driver) training:
- Operator will receive education on the characteristics of the waste being transported;
- Operator will ensure that the hazardous waste manifest, including the waste characterization, is present in the cab of the truck at all times;
- Operator will perform a pre-travel inspection of the vehicle and a safety check on the emergency equipment included with the vehicle;
- Operator will be trained to notify the correct authorities in case of an accidental waste spill during transport to the disposal facility; and
- Operator will be trained for emergency response.
- Notification to the California Highway Patrol's Incident Commander (IC).
- Notification to California Department of Transportation (Caltrans):
- If necessary, Caltrans will take the lead to ensure proper cleanup of the incident. Caltrans will determine which qualified operator will perform the cleanup depending upon conditions,

identification and hazard assessment, containment, and cleanup.

- Spill handling performed by Caltrans or qualified contractor:
- Safe approach;
- Isolation and containment;
- Notifications;
- Identification and hazard assessment; and
- Cleanup and disposal.

If a spill occurs at the property being cleaned up, the cleanup contractor will be prepared to respond in a safe and efficient manner specific to the spill situation. Procedures established in the Spill Response Plan will be used for handling of spills, whether they are onsite spills or spills occurring during transportation. The provisions of the Spill Response Plan will be strictly followed in order to ensure the continued protection of the public and the environment.

6.12 PROPERTY BACKFILL AND RESTORATION

For excavations that are 12 inches or deeper, structural soil fill material will be used to achieve backfill grades to within 6 inches of final grade. Fill material will contain enough organic and mineral content to support planting. Structural fill, unlike a pure sand fill material, contains enough fines to prevent accelerated drainage of water, and as such it is a satisfactory support for topsoil. A minimum of six (6) inches of topsoil will be placed as final grade in each excavation. For six (6)-inch excavations, only topsoil will be used to backfill the entire six (6)-inch depth.

Soil samples of any fill materials will be collected prior to use and will be submitted by the contractor for laboratory analysis. The sampling procedures will follow DTSC's *Information Advisory for Clean Imported Fill Material,* dated October 2001, included in Appendix E). Soil fill materials will be free from roots and other large organic matter, as well as trash, debris, and stones larger than 3 inches in any dimension. Soil fill materials (including topsoil if only topsoil is used) will be placed in loose, eight-inch layers and will be lightly compacted by mechanical methods, until final and pre-excavation or design grade is achieved.

Topsoil material will be a natural, friable soil with enough organic content and nutrients to sustain grass growth, and it will be free of trash or other deleterious debris. The maximum particle size will be 3/4 inch, and rocks larger than 1/8 inch will not exceed five (5) percent of the total weight. The topsoil will be screened, as required, so that the maximum particle size is not exceeded. Topsoil samples will be collected prior to use and will be submitted for laboratory analysis, and the results will be compared to the DTSC specified Residential Soil Backfill Values as well as to determine the appropriate soil nutrients and organic content. The topsoil must be free of total petroleum hydrocarbons, volatile and semi-volatile organic compounds, asbestos, polychlorinated biphenyls, pesticides, and herbicides. Topsoil materials will be placed to an approximately six (6)-inch depth over the structural soil fill material or unexcavated soils. After the topsoil is placed, it will be tilled to a depth of two (2) inches for acceptance of sod. If the homeowner selects mulch or decomposed granite as the final grade at the property, the property will be backfilled with clean soil to within two (2) to three (3) inches bgs and compacted to allow for the placement of the mulch or decomposed granite.

All fill replacement areas and areas disturbed by soil removal operations will be uniformly smooth graded to mimic the pre-excavation grades, except as necessary to permit adequate drainage (with the notification and acceptance of the property owner). Grade control will be performed to confirm the appropriate grades and to make modifications, as necessary. Properties will be backfilled with clean fill material and covered with surface landscape material selected by the property owner (e.g., decomposed granite, rock, bark or sod).

If the homeowner prefers replacement sod, a sod that tolerates the local climate conditions will be provided. The topsoil will be moistened before the sod is laid. The sod will be laid tightly together with no open joints visible and no overlapping. End joints will be staggered by a minimum of 12 inches. To ensure a good bond between sod and soil, the sod will be rolled using rollers not exceeding 100 pounds or using suitable wooden or metal tampers. Sod will be watered immediately after installation to a saturation depth of approximately three (3) inches. It will be the responsibility of the individual homeowners to maintain and water new sod after installation. In general, new sod should be watered twice a day for a 15- to 20-minute duration.

6.13 POST-CLEANUP INTERIOR CLEANING

DTSC will offer residents, free of charge, the opportunity to have the interior living spaces (i.e., living rooms, dining rooms, bathrooms, bedrooms) of their residence cleaned by a professional interior cleaning service after DTSC completes its cleanup. DTSC is offering interior cleaning as a precautionary measure to prevent potential residual exposure from lead in dust or soil inadvertently tracked into the residence. Professional interior cleaning services will include vacuuming the floors, carpets, upholstery, and draperies in interior living spaces with a high efficiency particulate air (HEPA) vacuum cleaner, followed by wet wipe cleaning of hard surfaces in interior living spaces where applicable. All waste generated during the cleaning will be collected by the cleaning service and will be disposed of appropriately. The professional interior cleaning service will work directly with residents to schedule the interior cleaning.

6.14 HEALTH AND SAFETY PLAN

The *Project Safety, Health and Environmental Plan* (Appendix E) establishes prudent health and safety guidelines to minimize the risk of occupational accidents and exposure to hazardous substances associated with environmental sampling and removal of potentially lead-impacted soil and construction debris materials. *The Project Safety, Health and Environment Plan*[38], in conjunction with the Transportation Plan in Appendix P, also provides emergency incident response guidelines and contacts in the event of an accident or a hazardous exposure. The *Project Safety, Health, and Environmental Plan* includes the following:

- Planned site activities;
- Site health and safety characterization;
- Physical hazards;
- Characterization of waste;
- Hazard evaluation of waste; and
- Responsibilities of key personnel.

The Project Safety, Health and Environment Plan was developed specifically for this cleanup and will be used to establish minimum onsite and offsite safety requirements, as well as policies and procedures adequate to protect site workers, the public, and the environment from the predicted hazards. All cleanup contractors involved in the removal, transport, and handling of impacted soil are required to abide by these minimum requirements. As indicated in the *Project Safety, Health and Environment Plan*, if unanticipated conditions occur at the site, the plan will be modified accordingly.

Modified, Level D PPE will be required for cleanup activities unless health and safety monitoring shows otherwise. If monitoring indicates a potential issue or exposure, then engineering controls or elevated PPE may be necessary to protect workers and the surrounding community. Chemical exposure to lead in soil for site workers is anticipated to be of low risk for this cleanup.

Dust generation as part of cleanup activities will be prevented or minimized with proper dust control measure (e.g. wetting of soil, slow excavation activities, etc.). As such exposure due to inhalation is of minimal concern. Dust suppression, and ambient and personnel air monitoring will be conducted as specified in Sections 6.3 and 6.4 above. Exposure due to ingestion may pose a risk to workers, which can be readily mitigated by proper use of Level D PPE. Hands and shoes may come in direct contact with potentially lead-impacted soil. Therefore, workers will be required to wear steel-toed work boots, latex gloves, high visibility vests, and hard hats as part of their Level D PPE. Handling of soil, soil samples, sampling equipment, and any other equipment that comes in contact with soil is only allowed while wearing latex gloves, or work gloves over latex gloves. Whenever a task necessitating the use of PPE is completed, the latex gloves will be discarded and hand washing will be required.

[38] A property-specific and/or contractor specific Health and Safety Plan, consistent with the Project Safety, Health and Environmental Plan, contained in Appendix E, may be prepared if site conditions warrant modifications.

Additionally, to prevent track-out offsite, work boots will be decontaminated by brushing off any loose soil on site, and washing the boots with water or detergent.

6.15 LETTER OF COMPLETION

Following the completion of cleanup activities for each property, the cleanup contractor will prepare and submit a Letter of Completion (LOC) for DTSC's review and approval. Once DTSC approves the LOC, it will be provided to the property owner and tenant, if requested, to document the cleanup activities that were completed at the property. The LOC will provide an overview of the cleanup and may include the following:

- Pre-Excavation Activities: copies signed access agreements; initial visit evaluation; identification and documentation of the presence of air ducts; documentation of interior cleaning requests; Pro UCL 5.1 (or latest version) output for the property; CDPH Abatement of Lead Hazards Evaluation Notification Form 8551 and Lead Hazard Evaluation Report Form 8552 or later versions; and applicable permits and utility clearances.
- Field Work Documentation: copies laboratory reports presenting results from XRF field measurements and fixed laboratory analyses of soil samples; figures illustrating work areas and sample locations; photographic chronology of field work; and confirmation sampling results.
- Post-Cleanup Evaluation and Restoration: Compensation Acknowledgement Forms; backfill compaction results; and Post-Cleanup Evaluation for Lead.

LOCs will be signed and stamped by a Lead Certified Industrial Hygienist and California-Licensed Civil Engineer.

7.0 PUBLIC INVOLVEMENT

DTSC's Public Participation Plan describes community concerns and identifies specific public participation activities to promote engagement and involvement from interested stakeholders and the community during the lead sampling and cleanup in the PIA surrounding the former Exide Facility. DTSC's *Public Participation Plan* may be revised or updated as appropriate. For example, to incorporate new information, reflect changes in community concern, and as part of discussions with community members, Exide Technologies Advisory Group members, additional external partners, and DTSC staff.

The purpose of this Public Participation Plan (PPP) is to formally document community concerns and describe the purpose, strategy and methodology for establishing and maintaining effective and open communication with the community and key stakeholders regarding the Offsite Properties within the Exide Preliminary Investigation Area (PIA).

DTSC's overall approach to closure, sampling, and cleanup activities associated with former Exide facility include:

- Sampling and cleanup of the PIA with available funds, while evaluating other potential options for funding further sampling and cleanup activities, including, for example, the Lead-Acid Battery Cleanup Fund established pursuant to AB 2153 (Christina Garcia, Statutes of 2016);
- Engaging federal, state, and local agencies, as well as nonprofit organizations, to obtain resources and expertise to support a comprehensive and coordinated cleanup of areas around the former Exide Facility;
- Coordinating with federal, state, and local agencies to reduce exposure to sources of lead, including lead-based paint, and ensure properties are not re-contaminated after cleanup;
- Partnering with community-based organizations to inform and engage residents, seek input, and arrange access with property owners for sampling and cleanup;
- Using the safest approach to close the Exide Facility, in coordination the SCAQMD and with input from the Exide Technologies Advisory Group and other community stakeholders; and
- Ensuring that Exide and other responsible parties are held responsible for funding the cleanup of contamination.

The Public Participation Plan builds on DTSC's *2014-2018 Strategic Plan's* Goal 5 - Engage the Public, which intends to increase the effectiveness of organizational engagement with external partners. Guidance for this goal includes:

- Building public confidence in DTSC and its decisions through meaningful engagement with communities and other stakeholders;
- Meeting the information and engagement needs of the communities DTSC serves, including communicating with communities and individuals in the way they need to be communicated with;
- Presenting complex technical information and processes in a manner that is accessible and understandable to affected communities and the public; and

- Ensuring that communities, the public, and other stakeholders are made aware of opportunities to participate in DTSC decisions, and the ways in which they may participate.

A formal public comment period on the Draft Cleanup Plan, originally scheduled to run from December 15, 2016, through January 31, 2017, was extended in response to requests from stakeholders. The public comment period ran from December 15, 2016 through February 15, 2017. Notice of the comment period and public meeting on the Draft Cleanup Plan was published in the Eastside Sun newspaper on December 15, 2016. A Public Notice was mailed to the Exide mailing list and sent electronically to those on the Exide Listserv on December 14, 2016, which provided information on how to access the Proposed Cleanup Plan as well as links to key technical documents, and information on the three public meetings to be held in the Los Angeles Area.

A second notice was sent on January 8, 2017, to remind the public about the three scheduled public meetings and the locations. A web based portal and email account was established for commenters to provide comments online. Written and verbal comments were also received at the public meetings held on the following dates and locations:

Wednesday, January 11, 2017	Thursday, January 19, 2017	Saturday, January 28, 2017
East Los Angeles Our Lady of Victory Church 1316 S Herbert Avenue Los Angeles, CA 90023	Maywood City Council Chambers 4319 East Slauson Avenue Maywood, CA 90270	Boyle Heights Resurrection Church 3324 Opal Street Los Angeles, CA 90023

Comments were received from individuals, local community groups, elected officials and public agencies covering a range of topics and varying perspectives. The comments expressed concerns related to timely notice and information, lack of understanding of the cleanup process, health issues, and declining property values of the homes in the area. The Public Participation Plan includes strategies for DTSC to establish and maintain effective and open communication with the community and key stakeholders to ensure that information is disseminated in the most suitable and understandable way. DTSC's Public Participation Plan will be made available in English and Spanish.

8.0 IMPLEMENTATION SCHEDULE AND ADMINISTRATIVE RECORD

8.1 IMPLEMENTATION SCHEDULE

DTSC is committed to implementing the Cleanup Plan in the most expeditious and protective way.

On April 20, 2016, Governor Edmund G. Brown, Jr., signed legislation providing a loan from the state general fund for $176.6 million in order to allow DTSC to expedite and expand testing and cleanup of sensitive land use properties—residential properties, schools, day care centers, and parks—around the former Exide Facility (Assembly Bill (AB) 118 (Santiago, Statutes of 2016)). Pursuant to the legislation, the Governor directed DTSC to test approximately 10,000 properties within the Preliminary Investigation Area—a 1.7-mile radius around the former Exide Facility—and clean up properties with the highest levels of lead and the greatest potential exposure.

With the presently available funding, DTSC anticipates that it will be able to cleanup approximately 2,500 sensitive land use properties within the Preliminary Investigation Area with the highest levels of lead and greatest potential exposure to sensitive individuals within two (2) years of cleanup activities commencing. Implementation of the Cleanup Plan is expected to commence in summer of 2017.

Based on DTSC's experience with cleanup actions at properties within the PIA, as well as consultation with the U.S. EPA about similar cleanup projects in other states, DTSC estimates the average cleanup rate will be about 25 to 35 properties per week. DTSC anticipates that cleanup efforts will start on a smaller scale at the beginning of project implementation, with about 10 to 15 properties cleaned up per week. This slower initial ramp-up period will allow DTSC to ensure that the workforce is appropriately trained and that work crews are familiar with and have practice implementing measures designed to mitigate project impacts before attempting to increase the rate of cleanup activities. After an initial ramp-up period of about two (2) months, DTSC expects to increase cleanup rates to 25 or more properties per week.

At an average rate of 25 properties per week, it will take about 100 weeks, or approximately two (2) years, to complete the cleanup of 2,500 properties. If the average rate is closer to 35 properties per week, it will take about 72 weeks, or about a year and a half (1½ years), to complete the cleanup of approximately 2,500 properties.

8.2 ADMINISTRATIVE RECORD

The Administrative Record for this Cleanup Plan is set forth at Appendix G.

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9.0 GLOSSARY OF TERMS

Background Lead Concentrations: Background concentrations refer to detected concentrations of lead in the "Background Area" selected by Exide's contractor (AGC) in a 2014 study of soil lead levels in an urban area in Long Beach, California similar to the area in the vicinity of the Exide Facility. Background lead levels represent soil conditions absent of impacts from operations at the Exide Facility, but representative of the geographical area. Background concentrations of lead in the upper 0-3 inches of soil ranged from 29 to 195 ppm with a median value of 54.8 ppm. See Section 2.2 for more information on the background lead study.

Best Management Practices: Best management practices (BMPs) represent industry recognized engineering controls, mitigation efforts, or institutional controls designed to mitigate the distribution or exposure to potential contaminants. BMPs for dust control include monitoring of wind speed and direction and the proactive use of water spray, physical covers, vehicle speed limitation, etc. to control dust generation and mitigate dust migration and exposure.

OEHHA Lead Toxicity Criterion: In 2007, the OEHHA updated its lead toxicity criteria to be more protective of human health, i.e., further reduce the potential for increases in blood lead levels. The use of OEHHA's lead toxicity criteria renders DTSC's risk models for the residential community around the Exide Facility highly protective of sensitive individuals, including children and women of childbearing age.

California Environmental Quality Act (CEQA): The California Environmental Quality Act (CEQA) was enacted in 1970 as a system of checks and balances for land-use development and management decisions in California. CEQA helps to ensure the environmental impacts of discretionary action are investigated prior to the start of a project. Courts have interpreted CEQA to afford the fullest protection of the environment within the reasonable scope of the statutes. CEQA applies to all discretionary projects proposed to be conducted or approved by a California public agency, including private projects requiring discretionary government approval.

California Regulated (non-RCRA) Hazardous Waste: A hazardous waste is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. In California, hazardous waste is divided into different types (e.g., universal waste) or categories, including RCRA hazardous waste and non-RCRA hazardous waste. California's hazardous waste laws are stricter than the federal law (i.e., RCRA). For this reason, some waste generated in California is considered hazardous, but does not fall under RCRA criteria for treatment, storage, and disposal.

Contaminant of Concern (COC): Contaminants of concern include specific chemicals that are identified for evaluation in the site assessment process. Lead is the primary COC referred to in this document.

Decision Unit: Refers to an area or volume of soil for which a decision is to be made. The area or volume is characterized using data from discrete soil sampling for lead within each unit.

Drip zone: The drip zone is the soil area around the perimeter of a house or other structure. Lead-impacted soils in the drip zone may be a result of lead-based paint used on the structure. This area typically has the highest concentration of lead because of exterior paint flaking or chipping onto the soil below.

Environmental Impact Report (EIR): Under CEQA, various environmental review documents may be prepared including, but not limited to, negative declarations, mitigated negative declarations, and EIRs. EIRs are prepared for projects expected to have significant impacts to the environment. An EIR is an informational document that informs the public agency decision-makers and the public generally of the significant environmental effects of a project; possible ways to minimize significant effects; and reasonable alternatives to the project.

Exide Facility: The lead battery recycling facility located at 2700 South Indiana Street, Vernon California owned and formerly operated by Exide Technologies.

Exposure Pathway: The pathways through which humans can come into contact with lead beginning with the source of the lead and ending with ingestion, inhalation, and direct or dermal contact. Exposure pathways are illustrated in a conceptual site model.

Ex-Situ Cleanup Technology: A cleanup technology applied to soil that has been physically removed from its original location (typically from below ground) and treated in a manner that isolates the soil from contaminating its original location.

General Response Actions: Describe the broad range of cleanup actions that will satisfy the cleanup objectives.

In-Situ Cleanup Technology: A cleanup technology applied to soil in place without physically removing the soil from its original location (often the ground).

Institutional Controls: Institutional Controls: also known as administrative or legal controls, Institutional Controls help minimize the potential for exposure to contamination and protect the integrity of a response action. Institutional Controls may restrict the use of land or resources or provide information to guide human interaction with a site in a manner that protects public health.

Intelligence Quotient (IQ): IQ is a number representing a person's reasoning ability (measured using problem-solving tests) as compared to the statistical norm or average for their age, taken as 100.

Land Use Covenant (LUC): A Land Use Covenant is a written instrument and agreement restricting land uses, easements, and servitudes for a given property. Recorded land use restrictions (or covenants) are provisions set forth in a document that can specify requirements on real property and affect the title, which is the evidence of ownership to property. Land use covenants are recorded at the county recorder's office so that they would be found during a title search of the property deed. Land use covenants entered into or required by DTSC "run with the land," i.e., are binding on current and subsequent property owners, and remain in effect until they are formally removed or modified, pursuant to Health and Safety Code sections 25233, 25234, and 25398.7. A LUC would place use restrictions on the property because [contaminants of concern or COCs] would continue to exist at the property above levels acceptable for unrestricted use of the property. These controls would allow a wide range of future uses for the site, but would limit sensitive uses (e.g., residences, schools, parks, and day care centers and child care facilities) and other uses that could involve excavation of impacted soil (e.g., such as an underground parking garage) if DTSC has not approved provisions for addressing the potentially- impacted soils. In addition to recording the LUC at the county recorder's office, environmental databases are being developed that include all properties with such use restrictions, for example DTSC's EnviroStor database. Such registries of properties with residual contamination would provide information to future property buyers or owners and minimize the potential for exposure to residual contamination.

National Contingency Plan (NCP): The National Oil and Hazardous Substances Pollution Contingency Plan (developed and published in 1968), more commonly called the National Contingency Plan or NCP, is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The NCP is the result of efforts to develop a national response capability and promote overall coordination among the hierarchy of responders and contingency plans.

Native Soils: Onsite soils that have not been impacted by human intervention or import fill.

Notice of Preparation (NOP): An NOP is a public document stating that an EIR will be prepared for a given project. An NOP includes, at minimum, a description of the project, the location of the project, a map of the project, and probable environmental effects of the project.

Personal Protective Equipment (PPE): PPE includes protective equipment (e.g., respirators, facemasks), clothing, hard hats, goggles, and other garments worn to protect the wearer from exposure to hazards and contaminants.

Process Options: Specific categories of remedies within each cleanup technology. Process options are used to implement each cleanup technology. For example, the cleanup technology of soil stabilization can be implemented using one of several types of reagents (e.g., Portland cement or a phosphate induced stabilization reagent). Each of these reagents is a separate process option

Cleanup Objectives: The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment. The goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste. The cleanup objectives define the mission of the cleanup.

Cleanup Technologies: General categories for remedies under a General Response Action. For example, soil washing is one of the cleanup technologies under the General Response Actions of ex-situ treatment.

RCRA: RCRA is an acronym for the federal Resource Conservation and Recovery Act. RCRA law is a federal law that establishes the framework through which hazardous and non-hazardous waste is controlled and disposed. RCRA's waste management program is mandated by Congress and enforced by USEPA. USEPA's regulations carry out the congressional intent by providing explicit, legally enforceable requirements for waste management. These waste control regulations can be found in title CFR, title 40, parts 239 through 282.

Representative soil lead concentration: Representative soil lead concentration means the 95 percent Upper Confidence Level (UCL) calculated for the property or decision unit.

Secondary Lead Smelter System: Secondary lead smelter systems are the processes through which lead is extracted from secondary sources (lead scrap). Lead scrap includes lead-acid batteries, cable coverings, pipes, sheets and lead coated metals. Secondary lead recovery occurs through several steps that include combustion and melting of lead-containing materials.

Sensitive Individuals: Sensitive individuals are those that may be particularly affected by exposure to a chemical. For this evaluation, the sensitive individuals are defined as children under seven (7) years of age and pregnant women.

Source Term Concentration: Concentration calculated for a specific contaminant (e.g., lead) considered representative of a Decision Unit for the purposes of health risk assessment, risk comparison, and evaluation of cleanup options.

South Coast Air Quality Management District (SCAQMD): The SCAQMD is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino counties. The PIA referenced in this document lies within the SCAQMD's jurisdiction.

Treatment Storage and Disposal Facility (TSDF): RCRA is a federal law that governs the disposal of solid and hazardous waste. Treatment, storage, and disposal facilities (TSDFs) are permitted facilities responsible for the treatment, storage and disposal of hazardous waste. Permitting requirements and TSDF standards are found in 40 CFR Park 264/265, Subparts A through E.

USEPA Regional Screening Level: Regional screening level refers to Regional Screening Levels as provided by USEPA. Regional screening levels are concentrations in media derived using standard exposure parameters (e.g., a resident is present at a site for 30 years, 350 days per year) and government derived toxicity values (i.e., cancer unit risk factors for carcinogens and non-cancer reference doses for non-carcinogens). Regional screening levels are provided for residential and commercial/industrial exposures to soil, air, and tap water (drinking water).

X-Ray Fluorescence (XRF): Emission of characteristic "secondary" (or fluorescent) X-rays from a material that has been excited by bombarding with high-energy X-rays. The phenomenon is widely used for elemental analysis and chemical analysis, particularly in the investigation of metals, glass, ceramics and building materials. XRF detectors are field instruments often used to measure the concentration of metals, including lead, in soil.

95 percent UCL: UCL refers to Upper Confidence Limit. The 95 percent UCL is a statistical value that, when repeatedly calculated for randomly drawn subsets of size *n* from a population equals or exceeds the population arithmetic mean 95 percent of the time. The arithmetic mean is calculated by adding up all the numbers in a data set and dividing the result by the total number of data points. The 95 percent UCL is used to adjust for the uncertainty associated with measuring the true average concentration at a given property. The 95 percent UCL is also referred to in the Cleanup Plan as the representative soil lead concentration.

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